

Five-Year Review Report

**Second Five-Year Review
for the
Bunker Hill Mining and Metallurgical Complex Superfund Site
Operable Units 1, 2, and 3
Idaho and Washington**

October 2005

PREPARED BY:



**United States Environmental Protection Agency
Region 10
Seattle, Washington**

Approved by:

A handwritten signature in black ink, appearing to read "Daniel D. Opalski", is written over a horizontal line.

Daniel D. Opalski, Director
Environmental Cleanup Office
USEPA Region 10

Date:

Oct. 24, 2005

USEPA ID: IDD048340921

[This page intentionally left blank.]

Contents

Glossary	xiii
Executive Summary	ES-1
Introduction.....	ES-1
Site Description.....	ES-1
Brief Site History.....	ES-2
Review of Selected Remedies	ES-3
Operable Unit 1.....	ES-3
Operable Unit 2.....	ES-5
Operable Unit 3.....	ES-6
Protectiveness of the Remedy	ES-10
Operable Unit 1.....	ES-10
Operable Unit 2.....	ES-11
Operable Unit 3.....	ES-12
Next Five-Year Review	ES-12
References	ES-13
Five-Year Review Summary Form	SF-1
1 Introduction.....	1-2
1.1 Statutory Requirements	1-1
1.2 Five-Year Review Process	1-2
1.2.1 Information Gathering.....	1-2
1.2.2 Technical Assessment	1-3
1.2.3 Issues and Recommended Follow-up Actions	1-3
1.2.4 Determining Remedy Protectiveness for Each Operable Unit.....	1-4
1.2.5 Community Involvement.....	1-4
1.2.6 Addressing Comments and Finalizing the Report	1-5
1.3 Relevant Guidance and Decision Documents	1-5
1.3.1 Guidance and Decision Documents.....	1-5
1.3.2 Obtaining Decision Documents, the Final Report, and the Responsiveness Summary	1-6
1.4 References	1-7
2 Background	2-1
2.1 Site Location, Description, and Characteristics	2-1
2.1.1 Operable Unit 1.....	2-1
2.1.2 Operable Unit 2.....	2-2
2.1.3 Operable Unit 3.....	2-2
2.2 Site History	2-5
2.2.1 Operable Unit 1 History	2-5
2.2.2 Operable Unit 2 History	2-7
2.2.3 Operable Unit 3 History	2-8
2.3 Source and Nature of Contamination.....	2-11

2.3.1 Source of Contamination.....	2-11
2.3.2 Nature and Extent of Contamination	2-11
2.4 State Superfund Contracts and Cost-Share Agreements	2-17
2.4.1 The Box SSC and SACA.....	2-17
2.4.2 The Basin SSC and Cost-Share Agreement.....	2-18
2.5 Basin Environmental Improvement Project Commission	2-19
2.6 References.....	2-22
 3 Review of Selected Remedies for OU1	 3-1
3.1 Overview of Selected Remedy.....	3-1
3.1.1 ARARs Review	3-4
3.2 Review of Site-Specific Work and Remedial Actions.....	3-4
3.2.1 Actions Since Last Five-Year Review	3-4
3.2.2 Technical Assessment	3-32
3.3 Performance Evaluation of the OU1 Remedy	3-42
3.4 References.....	3-43
 4 Review of Selected Remedies for OU2	 4-1
4.1 Overview of Selected Remedy.....	4-1
4.1.1 OU2 ARARs Review	4-9
4.1.2 Soil Excavation Goals.....	4-12
4.2 OU2-Wide Considerations	4-12
4.2.1 Institutional Controls Program.....	4-12
4.2.2 Health and Safety Review	4-15
4.2.3 Operation and Maintenance Plan.....	4-16
4.3 Review of Site-Specific Work and Remedial Actions.....	4-16
4.3.1 Hillsides	4-16
4.3.2 Gulches.....	4-26
4.3.3 Smelterville Flats	4-40
4.3.4 Central Impoundment Area.....	4-46
4.3.5 Page Pond (PRP Action)	4-55
4.3.6 Industrial Complex	4-60
4.3.7 Mine Operations and Boulevard Areas.....	4-68
4.3.8 Central Treatment Plant	4-72
4.3.9 Bunker Creek.....	4-78
4.3.10 Union Pacific Railroad Right-of-Way (PRP Action) in the Box ...	4-83
4.3.11 Milo Gulch (including Reed Landing).....	4-88
4.3.12 A-4 Gypsum Pond Closure (PRP Action)	4-95
4.3.13 South Fork Coeur d'Alene River Removal and Stabilization Project.....	4-100
4.3.14 Miscellaneous Box Projects	4-102
4.4 Monitoring.....	4-107
4.4.1 OU2 Water Quality Monitoring	4-108
4.4.2 Air Monitoring.....	4-112
4.4.3 Biological Monitoring	4-116
4.4.4 Data Management	4-128
4.5 Performance Evaluation of OU2 Remedy	4-129

4.5.1 Accomplishments	4-129
4.5.2 Evaluation of OU2 Phase I and Path Toward Potential OU2 Phase II Remedy	4-130
4.5.3 Full Implementation of the 2001 OU2 ROD Amendment	4-134
4.6 References	4-134
5 Review of Selected Remedies for OU3	5-1
5.1 Overview of OU3 Selected Remedy	5-1
5.1.1 Overview of Selected Human Health Remedy	5-6
5.1.2 Ecological Cleanup Actions	5-7
5.1.3 Coeur d'Alene Lake	5-11
5.1.4 Spokane River	5-11
5.1.5 Repositories for Material Generated by Cleanup Actions in OU3	5-13
5.2 ARARs Review	5-13
5.3 OU3-Wide Considerations	5-16
5.3.1 Institutional Controls in the Basin	5-16
5.3.2 Health and Safety Review	5-18
5.3.3 Operations and Maintenance Costs and Plans	5-19
5.4 Status of Removal Actions	5-19
5.4.1 Residential and Common Use Areas	5-20
5.4.2 Gem Portal Pilot	5-22
5.4.3 Success Mine Pilot	5-24
5.4.4 Black Rock Slough Trailhead/Highway 3 Crossing	5-28
5.4.5 Medimont and Rainy Hill Boat Launches	5-30
5.4.6 Thompson Lake Boat Ramp	5-32
5.4.7 Anderson Lake Boat Launch	5-34
5.4.8 Summary of OU3 Removal Actions	5-36
5.5 Review of OU3 ROD Site-Specific Work and Remedial Actions	5-42
5.5.1 Remediation in Residential and Community Areas	5-42
5.5.2. Ecological Evaluations	5-65
5.5.3 Review of Treatability Studies	5-72
5.5.4 Washington Recreation Areas along the Spokane River	5-88
5.5.5 Mine and Mill Sites	5-92
5.5.6 Repositories	5-100
5.6 Environmental Monitoring	5-105
5.6.1 Basin Environmental Monitoring Plan	5-106
5.6.2 Remedial Action Effectiveness Monitoring	5-117
5.7 Coeur d'Alene Lake	5-119
5.7.1 Lake Management Plan	5-119
5.7.2 Coeur d'Alene Lake Environmental Monitoring Plan	5-122
5.7.3 Technical Assessment of OU3 Coeur d'Alene Lake	5-123
5.8 UPRR Removal Action (Trail of the Coeur d'Alenes)	5-124
5.8.1 Decision Document	5-124
5.8.2 Background and Description of Actions	5-125
5.8.3 Removal Actions	5-127
5.8.4 Actions Since Last Five-Year Review	5-129
5.8.5 Institutional Controls	5-130

5.8.6 Technical Assessment of UPRR Removal Action	5-130
5.9 Performance Evaluation of OU3 Remedy	5-132
5.10 References	5-133
6 Actions, Issues, and Recommendations	6-1
6.1 Operable Unit 1	6-1
6.2 Operable Unit 2	6-1
6.3 Operable Unit 3	6-1
7 Statement of Protectiveness	7-1
7.1 Operable Unit 1	7-1
7.2 Operable Unit 2	7-1
7.3 Operable Unit 3	7-3
8 Next Five-Year Review	8-1

Appendix A. Responsiveness Summary

Tables

ES-1	Summary of ROD Activities and Remedial Actions – Operable Unit 1	ES-15
ES-2	Summary of Issues - Operable Unit 1	ES-16
ES-3	Summary of Recommendations and Follow-Up Actions – Operable Unit 1	ES-17
ES-4	Summary of ROD Activities and Remedial Actions – Operable Unit 2	ES-19
ES-5	Summary of Issues - Operable Unit 2	ES-25
ES-6	Summary of Recommendations and Follow-Up Actions – Operable Unit 2	ES-28
ES-7	Summary of Removal Actions – Operable Unit 3	ES-33
ES-8	Summary of Issues - Operable Unit 3 Removal Actions	ES-39
ES-9	Summary of Recommendations and Follow-Up Actions – Operable Unit 3 Removal Actions	ES-40
ES-10	Summary Activities and Remedial Actions – Operable Unit 3	ES-46
ES-11	Summary of Issues - Operable Unit 3 Remedial Actions	ES-49
ES-12	Summary of Recommendations and Follow-up Actions – Operable Unit 3 Remedial Actions	ES-51
2-1	Summary of Major Events at the Bunker Hill Superfund Site from 1883 – 2003	2-20
3-1	Percent of Yards Remediated, and Estimated Number of Yards Remaining to be Remediated	3-5
3-2	Yard Soil Remediation Progress, 1989-2004	3-6
3-3	Observed Decrease in Geometric Mean Yard Soil Lead Concentrations by City	3-12
3-4	Observed Decrease in Geometric Mean Vacuum Dust Lead Concentrations by City	3-17
3-5	Homes $\geq 1,000$ mg/kg Vacuum Dust Lead Concentration by City	3-17
3-6	Children Exceeding the 10 $\mu\text{g}/\text{dL}$ Blood Lead Level RAO by City	3-19
3-7	Children Exceeding the 15 $\mu\text{g}/\text{dL}$ Blood Lead Level RAO by City	3-19
3-8	Yard Soil Lead Exposure by Year, 1974-2002b	3-21
3-9	House Dust Lead Exposure by Year, 1974-2002b	3-23
3-10	OU1 ICP Permits Issued (2000 - 2004)	3-30
3-11	Summary of OU1 Issues	3-40
3-12	Summary of OU1 Recommendations and Follow-Up Actions	3-41
4-1	Summary of OU2 Phase I Remedial Actions to Date	4-7
4-2	OU2 ICP Permits Issued (2000 - 2004)	4-13
4-3	Summary of OU2 ICP Remedy Issues	4-14
4-4	Summary of Recommendations and Follow-up Actions for OU2 ICP	4-14
4-5	Hillsides Remedial Actions Required	4-18
4-6	Hillsides Remediation Prior to Year 2000	4-19
4-7	Summary of Remedial Actions (Exclusive of Tree Planting) Conducted on the Bunker Hill Hillsides from 1998 through 2001	4-20
4-8	Range of Monthly Maximum, Daily-Average Turbidity in Hillsides Watersheds (NTU)	4-22
4-9	Overall Plant Cover Class Distributions Found in 2003 Monitoring Work	4-22
4-10	Summary of Hillsides Remedy Issues	4-26
4-11	Summary of Hillsides Recommendations and Follow-Up Actions	4-26
4-12	ROD and ROD Amendment Remedial Actions Common to all Gulches	4-28
4-13	Grouse Gulch Phase I Remedial Actions (as summarized in initial five-year review report)	4-30

4-14	ROD and ROD Amendment Remedial Actions Specific to Government Gulch.....	4-31
4-15	Government Gulch Phase I Remedy Implementation Prior to Year 2000.....	4-32
4-16	ROD and ROD Amendment Remedial Actions Specific to Upper Magnet Gulch ..	4-33
4-17	Upper Magnet Gulch Phase I Remedial Actions Prior to Year 2000.....	4-34
4-18	1992 OU2 ROD Remedial Actions Specific to Deadwood Gulch	4-35
4-19	Deadwood Gulch Phase I Remedial Actions Prior to Year 2000	4-35
4-20	Railroad Gulch Phase I Remedial Actions Prior to Year 2000.....	4-36
4-21	Summary of Gulches Remedy Issues	4-39
4-22	Summary of Gulches Recommendations and Follow-Up Actions.....	4-39
4-23	Smelterville Flats Remedial Actions Required	4-40
4-24	Smelterville Flats Phase I Remedial Actions Prior to Year 2000 (as summarized in the initial five-year review report)	4-41
4-25	Summary of Smelterville Flats Remedy Issues	4-45
4-26	Summary of Smelterville Flats Recommendations and Follow-Up Actions	4-46
4-27	Central Impoundment Area Remedial Actions Required	4-48
4-28	Central Impoundment Area Phase I Remedial Actions Prior to Year 2000	4-49
4-29	Summary of CIA Remedy Issues	4-54
4-30	Summary of CIA Recommendations and Follow-Up Actions.....	4-54
4-31	Page Pond Remedial Actions.....	4-56
4-32	Summary of Page Pond Remedy Issues.....	4-59
4-33	Summary of Page Pond Recommendations and Follow-Up Actions	4-59
4-34	Industrial Complex Remedial Actions Required	4-60
4-35	Smelter Closure Area Remediation Prior to Year 2000	4-62
4-36	Borrow Area Landfill Activities Prior to Year 2000.....	4-64
4-37	Area 14 Activities Prior to Year 2000	4-64
4-38	Summary of Industrial Complex Remedy Issues	4-67
4-39	Summary of Industrial Complex Recommendations and Follow-Up Actions.....	4-67
4-40	Mine Operations and Boulevard Areas Remedial Actions Required	4-70
4-41	MOA Remediation Prior to Year 2000 (as reported in the first Five-Year Review Report)	4-70
4-42	Boulevard Area Remediation Actions Prior to Year 2000	4-71
4-43	Summary of MOA and Boulevard Remedy Issues.....	4-72
4-44	Summary of MOA and Boulevard Recommendations and Follow-Up Actions.....	4-72
4-45	CTP Remedial Actions Required.....	4-74
4-46	CTP Remediation Prior to Year 2000	4-75
4-47	Summary of CTP Remedy Issues	4-78
4-48	Summary of CTP Recommendations and Follow-Up Actions	4-78
4-49	Bunker Creek Remedial Actions Required	4-79
4-50	Bunker Creek Phase I Remedial Actions Prior to Year 2000	4-80
4-51	Summary of Bunker Creek Remedy Issues	4-82
4-52	Summary of Bunker Creek Recommendations and Follow-Up Actions.....	4-82
4-53	Box UPRR ROW Remedial Actions Required by 1992 OU2 ROD (Section 9.2.6)	4-84
4-54	Box UPRR ROW Remediation Prior to Year 2000.....	4-85
4-55	Summary of Box UPRR ROW Remedy Issues	4-87
4-56	Summary of Box UPRR ROW Recommendations and Follow-Up Actions.....	4-88
4-57	Milo Gulch Remedial Actions Required	4-88
4-58	Milo Gulch Remediation Prior to Year 2000.....	4-91

4-59	Reed Landing Remediation Prior to Year 2000	4-92
4-60	Summary of Milo Gulch Remedy Issues.....	4-94
4-61	Summary of Milo Gulch Recommendations and Follow-Up Actions	4-95
4-62	A-4 Gypsum Pond ROD Required Remedial Actions	4-96
4-63	A-4 Gypsum Pond Remediation Completed Prior to Year 2000	4-96
4-64	A-4 Gypsum Pond Remediation Completed Since the Year 2000.....	4-97
4-65	Summary of A-4 Gypsum Pond Remedy Issues.....	4-99
4-66	Summary of A-4 Gypsum Pond Recommendations and Follow-Up Actions	4-100
4-67	SFCDR Remediation Prior to Year 2000	4-100
4-68	Summary of SFCDR Removal and Stabilization Project Remedy Issues	4-101
4-69	Summary of SFCDR Removal and Stabilization Project Recommendations and Follow-Up Actions.....	4-102
4-70	Miscellaneous Box Projects Since 1998	4-102
4-71	Summary of Miscellaneous Box Project Remedy Issues.....	4-107
4-72	Summary of Miscellaneous Box Capping Recommendations and Follow-Up Actions	4-107
4-73	Summary of Water Quality Monitoring Remedy Issues	4-112
4-74	Summary of Water Quality Monitoring Recommendations and Follow-Up Actions	4-112
4-75	Summary of Air Monitoring Remedy Issues.....	4-116
4-76	Summary Air Monitoring Recommendations and Follow-Up Actions	4-116
4-77	OU2 Biological Monitoring Program Summary	4-117
4-78	Summary of OU2 Biological Monitoring Remedy Issues.....	4-127
4-79	Summary of OU2 Biological Monitoring Recommendations and Follow-Up Actions	4-128
5-1	Summary of OU3 ICP Issues.....	5-17
5-2	Summary of OU3 ICP Recommendations	5-17
5-3	Summary of Gem Portal Remedy Issues.....	5-24
5-4	Summary of Gem Portal Recommendations and Follow-Up Actions	5-24
5-5	Chronology of Activities at the Success Site	5-25
5-6	Summary of Success Mine Pilot Remedy Issues	5-28
5-7	Summary of Success Mine Pilot Recommendations and Follow-Up Actions	5-28
5-8	Summary of Black Rock Slough Trailhead/ Highway 3 Remedy Issues	5-30
5-9	Summary of Black Rock Slough Trailhead/ Highway 3 Crossing Recommendations and Follow-Up Actions.....	5-30
5-10	Summary of Medimont and Rainy Hill Boat Launches Remedy Issues	5-32
5-11	Summary of Medimont and Rainy Hill Boat Launches Recommendations and Follow-Up Actions	5-32
5-12	Summary of Thompson Lake Boat Launch Issues.....	5-34
5-13	Summary of Thompson Lake Boat Launch Recommendations and Follow-Up Actions	5-34
5-14	Summary of Anderson Lake Boat Launch Remedy Issues	5-35
5-15	Summary of Anderson Lake Boat Launch Recommendations and Follow-Up Actions	5-36
5-16	Summary of Removal Actions – Operable Unit 3.....	5-37
5-17	Residential Removal and Remedial Actions by Year Not Including OU1 and OU2	5-43

5-18	Results from 2002 Basin Sampling by Sample Location in All Areas	5-44
5-19	Results from 2003 Basin Sampling by Sample Location in All Areas	5-45
5-20	Results from 2004 Basin Sampling by Sample Location in All Areas	5-45
5-21	2000 Basin Blood Lead Summary Statistics by Geographic Area (0-9 years)	5-49
5-22	2001 Basin Blood Lead Summary Statistics by Geographic Area (0-6 years)	5-49
5-23	2002 Basin Blood Lead Summary Statistics by Geographic Area (0-6 years)	5-50
5-24	2003 Basin Blood Lead Summary Statistics by Geographic Area (0-6 years)	5-50
5-25	2004 Basin Blood Lead Summary Statistics by Geographic Area (0-6 years)	5-51
5-26	Basin Blood Lead Summary by Year, 1996-2004 (age 0-6 only)	5-51
5-27	Summary of Residential and Common Use Areas Remediation Issues	5-55
5-28	Summary of Residential and Common Use Areas Remediation Recommendations and Follow-Up Actions	5-55
5-29	Summary of Coeur d'Alene Lake Fish Investigation Issues	5-58
5-30	Summary of Coeur d'Alene Lake Fish Investigation Recommendations and Follow-Up Actions	5-58
5-31	Recreational Sites - Active Remediation (Excerpt from Basin Commission February 2003)	5-60
5-32	Summary of Lower Basin Recreational Area Issues	5-64
5-33	Summary of Lower Basin Recreational Area Recommendations and Follow-Up Actions	5-65
5-34	Summary of Migratory Songbird Study Issues	5-72
5-35	Summary of Migratory Songbird Study Recommendations and Follow-Up Actions	5-72
5-36	OU3 ROD Selected Remedy Water Treatment Zinc Load Reduction	5-73
5-37	Canyon Creek Water Treatment Issues	5-75
5-38	Summary of Canyon Creek Water Treatment Recommendations and Follow-Up Actions	5-76
5-39	Summary of Agricultural to Wetland Issues	5-77
5-40	Summary of Agricultural to Wetland Recommendations and Follow-Up Actions	5-77
5-41	Summary of Soil Amendment Study Issues	5-81
5-42	Summary of Soil Amendment Study Recommendations and Follow-Up Actions	5-81
5-43	Silver Dollar Demonstration Project Participants	5-82
5-44	Seed Mix Used on the Silver Dollar Demonstration Plots	5-83
5-45	Summary of Silver Dollar Growth Media Pilot Issues	5-88
5-46	Summary of Growth Media Pilot Recommendations and Follow-Up Actions	5-88
5-47	Summary of Remedy Issues, Spokane River, Washington, Recreation Areas	5-91
5-48	Summary of Recommendations and Follow-Up Actions, Spokane River, Washington, Recreation Areas	5-92
5-49	Summary of Upper Basin Mine and Mill Site Issues	5-96
5-50	Summary of Recommendations and Follow-Up Actions, Upper Basin Mine and Mill Sites	5-97
5-51	Summary of Coeur d'Alene Mine and Mill Issues	5-98
5-52	Summary of Recommendations and Follow-Up Actions, Coeur d'Alene Mine and Mill	5-99
5-53	Summary of Silver Summit Mill Issues	5-100

5-54	Summary of Recommendations and Follow-Up Actions, Silver Summit Mill.....	5-100
5-55	Summary of Repository Issues	5-104
5-56	Summary of Recommendations and Follow-Up Actions, Repository	5-105
5-57	OU3 Basin Environmental Monitoring Plan Summary (Excerpt from USEPA, 2004)	5-111
5-58	OU3 Basin Environmental Monitoring Plan Monitoring Schedule (Excerpt from USEPA, 2004).....	5-112
5-59	Flow and Dissolved Concentrations of Cadmium, Lead, and Zinc Sampled During October of Water Year 2004 at BEMP's Seven Sentinel and Eight Benchmark Stations	5-114
5-60	Statistical Summary of Flow, Trace Elements, Nutrients, and Suspended Sediment Sampled During Water Year 2004 at BEMP's Seven Sentinel Stations...	5-115
5-61	Summary of BEMP Issues	5-117
5-62	Summary of BEMP Recommendations and Follow-Up Actions.....	5-117
5-63	Summary of Remedial Action Effectiveness Monitoring Issues.....	5-118
5-64	Summary of Remedial Action Effectiveness Monitoring Recommendations and Follow-Up Actions.....	5-119
5-65	Summary of Coeur d'Alene Lake Issues	5-124
5-66	Summary of Coeur d'Alene Lake Recommendations and Follow-Up Actions.....	5-124
5-67	Summary of UPRR Removal Action Issues	5-132
5-68	Summary of UPRR Removal Action Recommendations and Follow-Up Actions	5-132
6-1	Summary of ROD Activities and Remedial Actions - Operable Unit 1	6-2
6-2	Summary of Issues - Operable Unit 1	6-3
6-3	Summary of Recommendations and Follow-Up Actions - Operable Unit 1	6-4
6-4	Summary of ROD Activities and Remedial Actions - Operable Unit 2	6-6
6-5	Summary of Issues - Operable Unit 2.....	6-12
6-6	Summary of Recommendations and Follow-Up Actions - Operable Unit 2.....	6-15
6-7	Summary of Removal Actions - Operable Unit 3.....	6-20
6-8	Summary of Issues - Operable Unit 3 Removal Actions.....	6-26
6-9	Summary of Recommendations and Follow-Up Actions - Operable Unit 3 Removal Actions.....	6-27
6-10	Summary Activities and Remedial Actions - Operable Unit 3.....	6-33
6-11	Summary of Issues - Operable Unit 3 Remedial Actions.....	6-36
6-12	Summary of Recommendations and Follow-up Actions - Operable Unit 3 Remedial Actions.....	6-38

Figures

2-1	Location Map, Bunker Hill Superfund Site	2-3
3-1	Map of Communities in OU1	3-2
3-2	OU1 Timeline	3-3
3-3	Community Geometric Mean Soil Lead Concentration and Progress Towards Remedial Action Objective, 1989-2004	3-10
3-4	Percentage of Yard Remediations Completed by City, 1989-2004	3-11
3-5	House Dust Vacuum Bag Lead Concentration by City, 1988-2004	3-16
3-6	Children's Blood Lead Levels by Year, 1974-2002.....	3-18

3-7	Percent of Children with Blood Levels ≥ 10 $\mu\text{g}/\text{dL}$, Blood Levels ≥ 15 $\mu\text{g}/\text{dL}$, and the Percent of All Children Tested Residing on Contaminated Yards, OU1, 1988-2002	3-20
3-8	OU1 Intake Rates and Geometric Mean Blood Lead Levels	3-27
3-9a	Current Subsurface Soil (below Barrier) Lead Concentrations for Smelterville, Idaho.....	3-33
3-9b	Current Subsurface Soil (below Barrier) Lead Concentrations for Kellogg, Idaho.....	3-34
3-9c	Current Subsurface Soil (below Barrier) Lead Concentrations for Pinehurst, Idaho.....	3-35
4-1	OU2 Site Map	4-3
4-2	OU2 Remedial Action Timeline	4-5
4-3	OU2 Hillsides Site Map	4-17
4-4	OU2 Gulches Site Map.....	4-27
4-5	OU2 Smelterville Flats Site Map.....	4-43
4-6	OU2 CIA Site Map.....	4-47
4-7	Evolution of the CIA	4-51
4-8	OU2 Smelter Closure Area Site Map	4-63
4-9	OU2 Mine Operations Area Site Map.....	4-69
4-10	OU2 Central Treatment Plant Site Map.....	4-73
4-11	OU2 Milo Gulch and Reed Landing	4-90
4-12	OU2 Groundwater Monitoring Network.....	4-109
4-13	OU2 Surface Water Monitoring Network.....	4-113
4-14	USFWS Biological Monitoring Sites (2001-2004).....	4-121
4-15	OU2 Property Parcels Conveyed to State of Idaho.....	4-131
5-1	OU3 Site Map	5-3
5-2	OU3 Timeline	5-5
5-3	Upper Coeur d'Alene Basin Cleanup Actions.....	5-9
5-4	Lower Coeur d'Alene Basin Cleanup Actions.....	5-12
5-5	Spokane River Cleanup Actions.....	5-14
5-6	Plot of mean (± 1 standard deviation) soil Pb concentration (mg/kg dw) at each of the locations sampled	5-68
5-7	Plot of mean ($+1$ standard deviation) of blood Pb concentrations (mg/kg wet wt.) for each species captured at each location.....	5-68
5-8	Plot of mean ($+1$ standard deviation) of blood ALAD (delta-aminolevulinate dehydratase) activity inhibition for each species at each sampled location	5-69
5-9	Plot of percent ALAD inhibition as a function of blood Pb (mg/kg ww).....	5-69
5-10	Comparison of Plant Frequencies across All Plots	5-85
5-11	Comparison of Plant Densities across All Plots	5-85
5-12	BEMP Monitoring Locations.....	5-109

Glossary

µg/m ³	Micrograms per cubic meter
µg/dL	Micrograms per deciliter
µg/L	Micrograms per liter
µg/g	Micrograms per gram
%AIA	Percent acid-insoluble ash
ACGIH	American Conference of Governmental Industrial Hygienists
Al	Aluminum
ALAD	Delta-aminolevulinate acid dehydratase activity
AMD	Acid mine drainage
amsl	Above mean sea level
AOC	Administrative order on consent
ARARs	Applicable or relevant and appropriate requirements
As	Arsenic
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient water quality criteria
BAL	Borrow Area Landfill
Basin	The area of land that collects the water runoff flowing to a surface water body. See “Coeur d’Alene River Basin”.
BBS	Breeding bird survey
BCR	Big Creek Repository
BDAT	Best demonstrated available technology
BDS	Idaho Bureau of Disaster Services
BEMP	Basin Environmental Monitoring Plan
BIF	Basin Information Forum
BLM	U.S. Bureau of Land Management
BLP	Bunker Limited Partnership
BMP	Best management practices
BNSF	Burlington Northern Santa Fe Railroad
Bunker Hill Box	A 21-square mile area surrounding the historic smelter area that includes the towns of Kellogg, Wardner, Smelterville, and Pinehurst, Idaho
CCC	Citizens Coordinating Council
CCP	Comprehensive Cleanup Plan
CD	Consent decree
CDA	Coeur d’Alene
CDC	Centers for Disease Control
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations

cfs	Cubic feet per second
CIA	Central Impoundment Area
CITU	Certificate of Interim Trail Use
CLCC	Clean Lakes Coordinating Council
COC	Chemical of concern
Coeur d'Alene River Basin	The drainage area of the Coeur d'Alene River in northern Idaho and northeastern Washington.
COR	Completion of obligation report
CSM	Conceptual site model
CTP	Central Treatment Plant
CUA	Common use areas
cy	Cubic yard
dw	Dry weight
EFNMC	East Fork Ninemile Creek
EE/CA	Engineering evaluation/cost analysis
ESD	Explanation of significant difference
FDR Work Plan	Flood damage repair work plan
FEMA	Federal Emergency Management Administration
FERC	Federal Energy Regulatory Commission
Flats	Smelterville Flats
FPS	Final performance standards
FS	Feasibility study
GCL	Geosynthetic clay liner
gpm	Gallons per minute
H&S	Health and safety
HDPE	High-density polyethylene
HDS	High-density sludge
HEPA	high-efficiency particulate air filter
HHRE	Human health remedial evaluation
HUC	Hydrologic unit code
HUD	Housing and Urban Development
I-90	Interstate 90
IBDS	Idaho Bureau of Disaster Services
ICP	Institutional controls program
ICs	Institutional controls
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDHW	Idaho Department of Health and Welfare
IDPR	Idaho Department of Parks and Recreation
IINERT	In-Place Inactivation and Natural Ecological Restoration Technologies
INEEL	Idaho National Engineering and Environmental Laboratory
IPS	Interim performance standards
ITD	Idaho Transportation Department
LEMP	Lake Environmental Monitoring Plan
LHIP	Lead Health Intervention Program

LMP	Lake Management Plan
LNFCDR	Little North Fork of the Coeur d'Alene River
LOAEL	Lowest observed adverse effects level
Lower Basin	The area of the CDA River Basin in OU3 west of Cataldo to the mouth of Coeur d'Alene Lake. Includes the lower Coeur d'Alene River and associated lateral lakes.
m ²	Square meters
M&R Plan	Maintenance and repair plan
MBTA	Migratory Bird Treaty Act
MCC	Motor control center
MCL	Maximum contaminant level
MCLG	Maximum contaminant level goal
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MOA	Memorandum of Agreement or Mine Operations Area
MP	Milepost
MSL	Mean sea level
N	Nitrogen
NAAQS	National Ambient Air Quality Standards
NCP	National Oil and Hazardous Substances Contingency Plan
NFA	No Further Action
NFCDR	North Fork Coeur d'Alene River
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List (list of Superfund sites)
NTR	National Toxics Rule
NRC	National Research Council of the National Academies
O&M	Operation and maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable unit (used to define specific cleanup areas of Superfund sites)
OU1	Operable Unit 1, the populated areas within the Bunker Hill Box
OU2	Operable Unit 2, the non-populated areas within the Bunker Hill Box
OU3	Operable Unit 3, the mining-contaminated areas in the broader Coeur d'Alene River Basin outside of OU1 and OU2, from approximately Mullan, Idaho, west to Coeur d'Alene Lake and depositional areas of the Spokane River in Idaho and Washington State. For study purposes, OU3 was divided into four areas: the Upper Basin (areas east of Cataldo, Idaho, outside the Box), the Lower Basin (west of Cataldo to the mouth of Coeur d'Alene Lake), Coeur d'Alene Lake, and depositional areas of the Spokane River.
Pb	Lead (the metal)
PCB	Polychlorinated biphenyl
PHD	Panhandle Health District
PM ₁₀	Particulate matter less than 10 microns
PPWTP	Page Pond Wastewater Treatment Plant
PRPs	Potentially responsible parties

PTMs	Principal threat materials
QA/QC	Quality assurance and quality control
RA	Remedial action
RAD	Response action design
RAMP	Remedial action management plan
RAOs	Remedial action objectives
RAWPs	Remedial action work plans
RCRA	Resource Conservation and Recovery Act
RD	Remedial design
RDRs	Remedial design reports
RI	Remedial investigation
ROD	Record of Decision
ROW	Right-of-way
RVT	Removal verification team
SACA	Support Agency Cooperative Agreement
SAMP	Special area management plan
SARA	Superfund Amendments and Reauthorization Act (amended CERCLA in 1986)
SCA	Smelter Closure Area
SDWA	Safe Drinking Water Act
SFCDR	South Fork of the Coeur d’Alene River
Silver Valley	The Coeur d’Alene River Valley in Northern Idaho
SMC	Stauffer Management Company
SMCRA	Surface Mining Control and Reclamation Act
SOW	Statement of work
SPLP	Synthetic precipitation leaching procedure
SSC	State Superfund Contract
STB	Surface Transportation Board
STORET	USEPA’s STORage and RETrieval database system
Superfund	A common name for USEPA’s CERCLA program
SVNRT	Silver Valley Natural Resources Trustees
TBC	To be considered
TCLP	Toxicity characteristic leaching procedure
TCRA	Time-critical removal action
TLG	Technical Leadership Group
TLOP	Trail Long-Term Oversight Program
TLV	Threshold limit value
TMDL	Total maximum daily load
TSCA	Toxic Substances Control Act
TSP	Total suspended particulates
TSS	Total suspended solids
UAO	Unilateral administrative order
UCFWO	Upper Columbia Fish and Wildlife Office
UMG	Upstream Mining Group

Upper Basin	The area of the CDA River Basin in OU3 east of Cataldo, Idaho, and outside the Bunker Hill Box. Includes the South Fork of the Coeur d'Alene River and its tributaries outside of the Box.
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USBM	U.S. Bureau of Mines
USEPA	U.S. Environmental Protection Agency
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDOE	Washington State Department of Ecology
WGI	Washington Group International
WIC	Woman Infant and Children (Clinics)
WSU	Washington State University
ww	Wet weight
WY	Water year

[This page intentionally left blank.]

Executive Summary

Introduction

The United States Environmental Protection Agency (USEPA) Region 10 has completed its second, site-wide review of the Bunker Hill Mining and Metallurgical Complex Superfund Facility (Bunker Hill Superfund Site or Site) located within northern Idaho, sections of the Coeur d'Alene Reservation, and northeastern Washington. This review was conducted from August 2004 through April 2005.

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121(c) requires the USEPA to perform a review of remedial actions that result in hazardous substances, pollutants, or contaminants remaining at the Site at least every five years. The purpose of the review is to assure the remedial actions are protective of human health and the environment. Projects implemented with Clean Water Act (CWA) funds were outside the scope of this review.

This five-year review report documents the methods, findings, and conclusions of this second, site-wide review of the Bunker Hill Superfund Site remedies, and identifies issues found during the review and recommendations to address them.

The text and summary tables in this Executive Summary provide an overview of the second, five-year review report. More detailed information is available in the following sections:

- Section 1: Introduction
- Section 2: Site Background
- Section 3: Review of Selected Remedies for Operable Unit 1
- Section 4: Review of Selected Remedies for Operable Unit 2
- Section 5: Review of Selected Remedies for Operable Unit 3
- Section 6: Findings and Recommendations
- Section 7: Statement of Protectiveness
- Section 8: Next Five-Year Review

Site Description

The Bunker Hill Superfund Site was listed on the National Priority List (NPL) in 1983. This NPL Site has been assigned Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) identification number IDD048340921. The Site includes mining-contaminated areas in the Coeur d'Alene River corridor, adjacent floodplains, downstream water bodies, tributaries, and fill areas, as well as the 21-square-mile Bunker Hill "Box" located in the area surrounding the historic smelting operations.

The USEPA has designated three operable units (OUs) for the Site:

- The populated areas of the Bunker Hill Box (OU1);
- The non-populated areas of the Box (OU2); and
- Mining-related contamination in the broader Coeur d'Alene Basin (the "Basin" or OU3).

Brief Site History

The Bunker Hill Superfund Site is within one of the largest historical mining districts in the world. Commercial mining for lead, zinc, silver, and other metals began in the Silver Valley in 1883. Heavy metals contamination in soil, sediment, surface water, and groundwater from over 100 years of commercial mining, milling, smelting, and associated modes of transportation has impacted both human health and environmental resources in many areas throughout the Site.

The principal sources of metals contamination were tailings generated from the milling of ore discharged to the South Fork Coeur d'Alene River (SFCDR) and its tributaries or confined in large waste piles onsite; waste rock; and air emissions from smelter operations. Tailings were frequently used as fill for residential and commercial construction projects. Spillage from railroad operations also contributed to contamination across the Site.

Tailings were also transported downstream, particularly during high flow events, and deposited as lenses of tailings or as tailings/sediment mixtures in the bed, banks, floodplains, and lateral lakes of the Coeur d'Alene River Basin and in Coeur d'Alene Lake. Some fine-grained material washed through the lake and was deposited as sediment within the Spokane River flood channel. The estimated total mass and extent of impacted materials (primarily sediments) exceeds 100 million tons dispersed over thousands of acres (USEPA, 2001c). Over time, groundwater also became contaminated with metals.

Air emissions occurred from ore-processing facilities in Kellogg and Smelterville. Although both the lead smelter and zinc plant had recycling processes designed to minimize air-borne particulates, significant metals deposition still occurred together with deposition of sulfur dioxide emissions. These emissions affected areas near the smelter and zinc plant, and greatly contributed to the denuding of surrounding hillsides.

Smelter operations ceased in 1981, but limited mining and milling operations continued onsite from 1988 to 1991, and small-scale mining operations continue today.

After listing on the NPL in 1983, remedial investigations (RIs) and feasibility studies (FSs) initially focused on the 21-square-mile Bunker Hill Box (MFG, 1992a and 1992b). The USEPA published the first Site Record of Decision (ROD) in August 1991 providing the Selected Remedy for OU1 residential soils (USEPA, 1991). The second ROD for the Site was published by the USEPA in September 1992 addressing contamination in the non-populated OU2, as well those aspects of OU1 that were not addressed in the 1991 OU1 ROD (USEPA, 1992). These two OUs then proceeded into remedial design (RD) and remedial action (RA) phases of work. Since publication of the 1992 OU2 ROD, a number of remedy changes and clarifications have been documented in two OU2 ROD amendments (September 1996 and December 2001) and two Explanations of Significant Differences or "ESDs" (January 1996 and April 1998).

The USEPA began the Remedial Investigation and Feasibility Study (RI/FS) for OU3 in 1998 (USEPA, 2001b and 2001c) and issued its interim thirty (30) year ROD to clean up mining contamination in 2002 (USEPA, 2002). A number of removal actions to address immediate threats and/or obvious sources of contamination in or along streams were initiated prior to the OU3 ROD. Remedial design, remedial action, and studies to support future OU3 remedial actions were initiated in 2003.

The first five-year review of the Bunker Hill Superfund Site remedies resulted in two separate five-year review reports: one for OU1 (USEPA, 2000b) and the other for OU2 (USEPA, 2000a). The USEPA published these reports in September 2000, approximately five years after initiation of the first remedial action at the Site. This five-year review is the second evaluation of remedy performance of OUs 1 and 2. It also focuses for the first time on the remedies for OU3; however, the large majority of the OU3 remedies have yet to be implemented.

Review of Selected Remedies

As stated above, the purpose of this review was to evaluate the remedies that have been or will be implemented at the Site. This second, site-wide five-year review report documents the results of the review, and identifies issues found during the review and the recommendations to address them. The USEPA will track the identified issues and recommendations to ensure that follow-up actions are completed.

The following section provides a summary of:

- The site activities and remedial actions completed in the last five years by operable unit; and
- The issues and recommendations identified during this review.

Operable Unit 1

Introduction

Operable Unit 1 is located within the 21-square-mile area surrounding the former smelter complex commonly referred to as the Bunker Hill Box. The Box is located in a steep mountain valley in Shoshone County, Idaho, east of the city of Coeur d'Alene. Interstate 90 (I-90) bisects the Box and parallels the SFCDR.

OU1 is often referred to as the populated areas of the Bunker Hill Box and is home to more than 7,000 people in the cities of Kellogg, Wardner, Smelterville, and Pinehurst, as well as the unincorporated communities of Page, Ross Ranch, Elizabeth Park, and Montgomery Gulch. The populated areas include residential and commercial properties, street rights-of-way (ROWs), and public use areas. Most of the residential neighborhoods and the former smelter complex are located on the valley floor, side gulches, or adjacent hillside areas. Cleanup activities first began in OU1 because this was the area of greatest concern for human health exposure from mine waste.

ROD Issuance

The OU1 Selected Remedy and remedial action objectives (RAOs) are described in the 1991 ROD (USEPA, 1991) and the 1992 ROD (USEPA, 1992). The primary goal of the OU1 Selected Remedy is to reduce children's intake of lead from soil and dust sources to meet the following RAOs:

- Less than 5 percent of children with blood lead levels of 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) or greater; and
- Less than 1 percent of children with blood lead levels of 15 $\mu\text{g}/\text{dL}$ or greater.

Major Components of the Selected Remedy

To achieve these objectives, the cleanup strategy includes:

- Implementation of a lead health intervention program for local families;
- Remediation of all residential yards, commercial properties, and right-of-ways (ROWs) that have soil lead concentrations greater than 1,000 milligrams per kilogram (mg/kg);
- Achieving a geometric mean yard soil lead concentration of less than 350 mg/kg for each residential community in OU1;
- Controlling fugitive dust and stabilizing and capping contaminated soils throughout the Bunker Hill Box (OU1/OU2);
- Achieving a geometric mean of interior house dust lead levels of 500 mg/kg or less for each community, with no individual house dust level exceeding 1,000 mg/kg ; and
- Establishing an Institutional Controls Program (ICP) to maintain protective barriers over time, and to ensure that future land use and development is compatible with the OU1 Selected Remedy.

Remedial Actions

Table ES-1 at the end of this summary provides a brief description of the activities and remedial actions conducted since the last five-year review for OU1 (USEPA, 2000b). More detailed descriptions of the various remedial actions and the specific ROD requirements that apply to each action are presented in Section 3 of this report.

Issues, Recommendations, and Follow-up Actions

As part of this five-year review, issues, recommendations, and follow-up actions have been identified to improve remedy performance or protectiveness to meet the RAOs and performance standards. Tables ES-2 and ES-3 summarize these issues, recommendations, and follow-up actions for OU1. Also identified in these tables are parties responsible for implementation and oversight of these actions, proposed completion milestone dates, and the potential to affect protectiveness of the remedy. This information is also summarized in Section 6.1

Operable Unit 2

Introduction

Operable Unit 2 includes the non-populated, non-residential areas of the Bunker Hill Box. These non-populated areas include the former industrial complex and Mine Operations Area (MOA) in Kellogg, the Smelterville Flats (the floodplain of the SFCDR in the western half of OU2), hillsides, various creeks and gulches, the Central Impoundment Area (CIA), and the Bunker Hill Mine and associated Acid Mine Drainage (AMD). The SFCDR within OU2 and the non-populated areas of the Pine Creek drainage are both addressed as part of OU3.

OU2 ROD Issuance

A ROD for OU2 was published by the USEPA in 1992 (USEPA, 1992). Since then, two OU2 ROD amendments (USEPA, 1996a and 2001a) and two ESDs (USEPA, 1996b and 1998) have been published.

The 1996 OU2 ROD Amendment changed the remedy for principal threat materials (PTMs) from chemical stabilization to containment. The 2001 OU2 ROD Amendment addressed AMD issues within the OU2 boundaries. To date, the USEPA and the State of Idaho have not concluded negotiations on a State Superfund Contract (SSC) amendment that allows for full implementation of the 2001 OU2 ROD Amendment. Time-critical components of this ROD amendment were implemented, however, to avoid potential catastrophic failure of the aging Central Treatment Plant (CTP) and to provide for emergency mine water storage (USEPA and IDEQ, 2003). These time-critical activities focused on preventing discharges of AMD to Bunker Creek and the SFCDR. Until a SSC amendment is signed allowing for full implementation of the 2001 OU2 ROD Amendment, control and treatment of AMD and its impact on water quality will continue to be an issue. The USEPA and the State of Idaho continue to discuss the SSC amendment, and the long-term obligations associated with the full mine water remedy.

The two ESDs did not change the OU2 Selected Remedy; rather they clarified portions of the remedy. The 1996 OU2 ESD addressed differences associated with placement of waste and demolition materials in the Smelter Closure Area (SCA). The 1998 OU2 ESD addressed differences associated with the stabilization and removal of contaminated materials located in the tributary gulches within OU2, the USEPA financial contribution to the lower Milo Creek/Wardner/Kellogg pipeline system, placement of mine wastes from outside of OU2 into the CIA, and other clarifications on the OU2 selected remedy (see Section 4.1).

Major Components of the Selected Remedy

The 1992 OU2 ROD set forth priority cleanup actions to protect human health and the environment. Cleanup actions included a series of source removals, surface capping, reconstruction of surface water creeks, demolition of abandoned milling and processing facilities, engineered closures for waste consolidated onsite, revegetation efforts, and treatment of contaminated water collected from various site sources.

In 1995, with the bankruptcy of the Site's major Potentially Responsible Party (PRP), the USEPA and the State of Idaho defined a path forward for phased remedy implementation in OU2. Phase I of remedy implementation includes extensive source removal and stabilization

efforts, all demolition activities, all community development initiatives, development and initiation of an ICP, future land use development support, and public health response actions. Also included in Phase I are additional investigations to provide the necessary information to resolve long-term water quality issues, including technology assessments and pilot studies, evaluation of the success of source control efforts, development of site-specific water quality and effluent-limiting performance standards, and development of a defined operation and maintenance (O&M) plan and implementation schedule. Interim control and treatment of contaminated water and AMD is also included in Phase I of remedy implementation. Phase I remediation began in 1995, and source control and removal activities are near completion.

Phase II of the OU2 remedy will be implemented following completion of source control and removal activities and evaluation of the impacts of these activities on meeting water quality improvement objectives. Phase II will consider any shortcomings encountered in implementing Phase I and will specifically address long-term water quality and environmental management issues. In addition, the ICP and future development programs will be reevaluated as part of Phase II.

The effectiveness evaluation of the Phase I source control and removal activities to meet the water quality improvement objectives of the 1992 OU2 ROD will be used to determine appropriate Phase II implementation strategies and actions. In addition, although the 1992 OU2 ROD goals did not include protection of ecological receptors, additional actions may be considered within the context of site-wide ecological cleanup goals. Both ROD and SSC amendments are required prior to implementation of Phase II remedial actions.

Remedial Actions

Table ES-4 provides a brief description of each activity or remedial action that is part of the OU2 remedy. More detailed descriptions of the various remedial actions and the specific ROD requirements that apply to each action are presented in Section 4 of this report.

Issues, Recommendations, and Follow-up Actions

As part of this five-year review, issues, recommendations, and follow-up actions have been identified to improve remedy performance or protectiveness to meet the RAOs and performance standards. Tables ES-5 and ES-6 summarize these for OU2. Also identified in these tables are parties responsible for implementation and oversight of these actions, proposed completion milestone dates, and the potential to affect protectiveness of the remedy. This information is also summarized in Section 6.2 of this report.

Operable Unit 3

Introduction

Operable Unit 3 consists of the mining-contaminated areas in the Coeur d'Alene Basin outside of OU1 and OU2, primarily the floodplain and river corridor of the Coeur d'Alene River (including Coeur d'Alene Lake) and the Spokane River, as well as those areas where mine wastes have come to be located as a result of their use for road building or for fill and construction of residential or commercial properties. Spillage from railroad operations also contributed to contamination across the Basin. OU3 contaminants are primarily metals, and

the metals of principal concern include lead and arsenic for protection of human health, and lead, cadmium, and zinc for protection of ecological receptors.

Removal Actions

Prior to issuance of the 2002 OU3 interim ROD (USEPA, 2002), some of the most highly impacted source materials were contained via removal actions to reduce human health and environmental risks. These removal actions were implemented under CERCLA primarily from 1997 to 2002, with a few occurring prior to that time and some continuing to the present. The OU3 removal actions are briefly summarized in Table ES-7 and again in Table 5-16 in Section 5 of this report. Tables ES-8 and ES-9 provide a summary of the issues and recommendations related to the OU3 removal actions.

RI/FS Process

From 1998 through 2001, the USEPA collected data and conducted an RI/FS for the Basin (USEPA, 2001b and 2001c). The area of study in the OU3 remedial investigation included four geographic areas:

- Upper Basin outside of the Box, which includes the communities of Mullan, Wallace, Burke, Osburn, Silverton, and the South Fork Coeur d'Alene River, Canyon Creek, Ninemile Creek, Big Creek, Moon Creek, and Pine Creek;
- Lower Basin, which includes the communities of Kingston, Cataldo, and Harrison, and the Coeur d'Alene River, adjacent lateral lakes, floodplains, and associated wetlands;
- Coeur d'Alene Lake; and
- Depositional areas of the Spokane River.

OU3 ROD Issuance

On September 12, 2002, the USEPA issued an interim ROD to address mining contamination in the broader Coeur d'Alene Basin (OU3) (USEPA, 2002). The cleanup plan resulted from several years of intensive studies to determine the extent of contamination and the associated risks to people and the environment. The 2002 OU3 interim ROD (2002 OU3 ROD) describes the specific cleanup work, called the interim Selected Remedy (the remedy) that will occur in the Basin at a cost of about \$360 million over approximately the next 30 years. The following governments and agencies in the areas targeted for cleanup gave their support for conducting the cleanup selected in the 2002 OU3 ROD: the State of Idaho, the Coeur d'Alene Tribe, the Spokane Tribe, the State of Washington, the U.S. Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service (USFWS), and the U.S. Forest Service (USFS).

The 2002 OU3 ROD represents a significant step toward meeting the goal of full protection of human health and the environment in the Basin. The cleanup plan includes:

- The full remedy needed to protect human health in the community and residential areas, including identified recreational areas of the Upper Basin and Lower Basin, as well as Washington recreational areas along the Spokane River upstream of Upriver Dam; and

- An interim remedy of prioritized actions for protection of the environment that focus on improving water quality, minimizing downstream migration of metal contaminants, and improving conditions for fish and wildlife populations.

Certain potential exposures to human health outside of the communities and residential areas of the Upper Basin and Lower Basin were not addressed by the 2002 OU3 ROD. These potential exposures impacting human health include:

- Recreational use at areas in the Upper Basin and Lower Basin where cleanup actions are not implemented pursuant to the 2002 OU3 ROD;
- Subsistence lifestyles, such as those traditional to the Coeur d'Alene and Spokane tribes; and
- Potential future use of groundwater that is currently contaminated with metals.

In addition, a remedy for Coeur d'Alene Lake is not included in the 2002 OU3 ROD. State, tribal, federal, and local governments are in the process of developing a revised lake management plan outside of the Superfund process using separate regulatory authorities.

Major Components of the Interim Selected Remedy

The 2002 OU3 ROD lays out approximately 30 years of priority cleanup actions that will maximize environmental protection and cost-effectiveness. For protection of human health in the community and residential areas of the Upper Basin and Lower Basin, the major components of the interim Selected Remedy include:

- Lead health information and intervention programs for residential and recreational users;
- Partial excavation and replacement of residential soils with lead concentrations above 1,000 mg/kg and/or arsenic concentrations above 100 mg/kg, a barrier such as a vegetative barrier to control or limit migration of soils with lead concentrations between 700 and 1,000 mg/kg, and a combination of removals, barriers, and access restrictions for street ROWs, commercial properties, and recreational areas;
- Alternate drinking water sources for residences using contaminated private drinking water sources;
- Evaluation of lead in house dust, after residential soil remediation is completed, to determine if interior cleaning is needed; and
- Establishment of an ICP to maintain protective barriers over time, and guide land use and future development.

For environmental protection in the Upper and Lower Basin, three environmental priorities were identified in the 2002 OU3 ROD:

- Dissolved metals in surface water (particularly zinc and cadmium) have harmful effects on fish and other aquatic life;
- Lead in soil and sediment is present in the beds, banks, and floodplains of the river system and has harmful effects on waterfowl and other wildlife; and

- Particulate lead in surface water is transported downstream and is a continuing source of contamination for the Coeur d'Alene River, Coeur d'Alene Lake, and the Spokane River. Lead transported in particulate form in the river has impacted recreational areas in the Lower Basin and the Spokane River, resulting in posted health advisory signs at beaches and swimming areas. During flood events, lead transported by the river also impacts the wetlands and floodplains.

The remedy for the Washington Recreational Areas along the Spokane River identified in the 2002 OU3 ROD is a combination of access controls, capping, and removals of metals-contaminated soil and sediment. The remedy includes water quality monitoring, aquatic life monitoring, remedial performance monitoring of sediments, and contingencies for additional or follow-up cleanups for the recreational areas. Ten shoreline recreation areas and one subaqueous area along the Spokane River in Washington State have been identified for further investigation and possible remedial action.

As stated above, a remedy for Coeur d'Alene Lake is not included in the 2002 OU3 ROD. State, tribal, federal, and local governments are in the process of developing a revised lake management plan outside of the Superfund process using separate regulatory authorities. The OU3 ROD does state, however, that the USEPA will evaluate lake conditions in future five-year reviews.

Implementing the Selected Remedy

The USEPA's first priority for implementation of the 2002 OU3 ROD is to remediate residential and recreational areas that pose direct human health risks. Subsequent actions will include cleanup of areas that pose ecological risks. EPA Region 10 has received funding for implementation of the OU3 human health remedy. The Region will continue to work with EPA Headquarters and other parties to secure funding for full implementation of the 2002 OU3 ROD.

Idaho state legislation under the Basin Environmental Improvement Act (Title 39, Chapter 810) established the Coeur d'Alene Basin Environmental Improvement Project Commission (Basin Commission). This commission includes federal, state, tribal, and local governmental involvement. The USEPA serves as the federal government representative to the Basin Commission and will continue to work closely with the governments and communities as they implement the cleanup plan. The USEPA will continue to be responsible for ensuring that the cleanup work meets the requirements of the 2002 OU3 ROD as well as CERCLA laws and regulations.

The National Academies' National Research Council (NRC) is conducting an independent evaluation of the Coeur d'Alene Basin to examine the USEPA's scientific and technical practices in Superfund site characterization, human and ecological risk assessment, remedial planning, and decision-making. The NRC is an independent, nongovernmental institution that advises the nation on scientific, technical, and medical issues. The Idaho Congressional delegation requested that the study be performed and Congress mandated that the USEPA fund the study at a cost of \$850,000. The NRC convened the Committee on Superfund Site Assessment and Remediation in the Coeur d'Alene Basin, composed of members with a wide range of expertise and backgrounds.

The NRC study began in June 2003. During the study, the NRC held public sessions in Washington, D.C.; Wallace, Idaho; and Spokane, Washington. On July 14, 2005, the NRC released a pre-publication version of its report (see www.nas.edu, search on “coeur”) (NRC, 2005). The pre-publication report reflects unanimous consensus of the Committee and has undergone a rigorous peer review process. On July 15, 2005, the NRC hosted a public meeting at the North Idaho College in Coeur d’Alene to share the report findings and answer questions from the public. The final NRC report will be published in book form in December 2005.

The USEPA is conducting a careful review of the NRC pre-publication report recommendations and findings. The USEPA, along with others invested in the issues, are considering the NRC report's recommendations and, where appropriate, will translate those findings into action.

In addition, Region 10 remains committed to work closely with the Basin Commission, as well as the Commission's Technical Leadership Group (TLG) and Citizens' Coordinating Council (CCC) in implementing the 2002 OU3 ROD.

Remedial Actions

Table ES-10 provides a brief description of each activity or remedial action that has been implemented to date as part of the OU3 remedy. More detailed descriptions of the various remedial actions and the specific ROD requirements that apply to each action are presented in Section 5 of this report.

Issues, Recommendations, and Follow-up Actions

As part of this five-year review, issues, recommendations, and follow-up actions have been identified to improve remedy performance or protectiveness to meet the RAOs and performance standards. As stated above, Tables ES-8 and ES-9 summarize these for OU3 removal actions. Tables ES-11 and ES-12 summarize these for the 2002 OU3 ROD remedial actions. Also identified in these tables are parties responsible for implementation and oversight of these actions, proposed completion milestone dates, and the potential to affect protectiveness of the remedy. This information is also summarized in Section 6.3.

Protectiveness of the Remedy

Operable Unit 1

The remedy being implemented in OU1 is expected to be protective of human health and the environment upon completion, provided that follow-up actions identified in Table ES-3 are implemented.

Although the remedy has not been fully implemented, environmental data (except ROW data) indicate that the remedy is functioning as intended by the ROD. As remediation nears completion, soil and house dust lead concentrations are declining, lead intake rates have been substantially reduced, and blood lead levels have achieved their RAOs. House dust lead levels are declining but some individual homes continue to exceed lead concentrations of 1,000 mg/kg. For ROWs, data indicate that lead levels are stabilizing but are continuing to slowly increase over time.

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy; however, due to the history of flooding in the area, it is possible that future flood events may affect remedy protectiveness. In addition, the ability of the local communities to improve and maintain infrastructure to protect the remedy is a concern. Infrastructure improvements and ROW recontamination will be evaluated in the next five-year review, as well as determining whether all the RAOs have been met once the remedy is completed.

Operable Unit 2

The remedy being implemented in OU2 is expected to be protective of human health and the environment upon completion, and in the interim, human health exposure pathways that could result in unacceptable risks are being controlled.

In 1995, with the bankruptcy of the Site's major PRP, the USEPA and the State of Idaho defined a path forward for phased remedy implementation in OU2. Phase I of remedy implementation includes extensive source removal and stabilization efforts, all demolition activities, all community development initiatives, development and initiation of an ICP, future land use development support, and public health response actions. Also included in Phase I are additional investigations to provide the necessary information to resolve long-term water quality issues, including technology assessments and pilot studies, evaluation of the success of source control efforts, development of site-specific water quality and effluent-limiting performance standards, and development of a defined O&M plan and implementation schedule. Interim control and treatment of contaminated water and AMD is also included in Phase I of remedy implementation. Phase I remediation began in 1995, and source control and removal activities are near completion.

Since beginning the implementation of Phase I in 1995, a significant amount of remediation work has been conducted. As summarized in Table 4-1 of this report, over 3.3 million cubic yards of contaminated waste have been removed and consolidated onsite in engineered closure areas (the Smelter and CIA Closures). The use of geomembrane cover systems on these closure areas effectively removes these contaminated wastes from direct contact by humans and biological receptors. Consolidating these wastes in engineered closures also substantially reduces the exposure pathway to the surface water and groundwater environment in comparison to pre-remediation site conditions.

Also, as summarized in Table 4-1, over 800 acres of property within OU2 have been capped to eliminate direct contact with residual contamination that remains in place within some areas of OU2. In addition, the revegetation work conducted as part of the Phase I remedial actions has substantially controlled erosion and has significantly improved the visual aesthetics of OU2. The success of the Phase I revegetation efforts is providing improved habitat for wildlife that was largely absent for decades in many areas of the hillsides and Smelterville Flats.

All of these efforts have reduced or eliminated the potential for humans to have direct contact with soil/source contaminants, have reduced opportunities for transport of contaminants by surface water and air, and are expected to provide surface and groundwater quality improvements over time throughout the Site.

Phase II of the OU2 remedy will be implemented following completion of source control and removal activities and evaluation of the impacts of these activities on meeting water quality improvement objectives. Phase II will consider any shortcomings encountered in implementing Phase I and will specifically address long-term water quality and environmental management issues. In addition, the ICP and future development programs will be reevaluated as part of Phase II.

The effectiveness evaluation of the Phase I source control and removal activities to meet the water quality improvement objectives of the 1992 OU2 ROD will be used to determine appropriate Phase II implementation strategies and actions. In addition, although the 1992 OU2 ROD goals did not include protection of ecological receptors, additional actions may be considered within the context of site-wide ecological cleanup goals. Both ROD and SSC amendments are required prior to implementation of Phase II remedial actions.

Per the motion passed by the Basin Commission in August 2005, the Basin Commission will participate in future Phase II activities in OU2 by providing technical input into the remedy alternative development and selection (including evaluation of technical reports, pilot studies, and feasibility study documents), providing input into the public processes associated with ROD modifications and educating the community and legislative bodies of the need for funding for this work.

In addition to evaluating Phase I actions and identifying possible Phase II actions, a SSC amendment that allows for the full implementation of the 2001 OU2 ROD Amendment needs to be negotiated and signed. Time-critical components of this ROD amendment were implemented to prevent catastrophic failure of the CTP and discharges of AMD to Bunker Creek and the SFCDR. Until a SSC amendment is signed, however, control and treatment of AMD and its impact on water quality will continue to be an issue. The USEPA and the State of Idaho continue to discuss the SSC amendment and the long-term obligations associated with the mine water remedy.

Operable Unit 3

The OU3 ROD is a 30-year cleanup plan that was published by the USEPA in September 2002. Therefore, remedy implementation has been ongoing for approximately three years and a protectiveness determination of the OU3 remedy cannot be made until further information is obtained. This additional information will be collected during the implementation of the remedy and through the completion of studies that support the remedy. For the human health remedy being implemented in the OU3 residential and community areas, including identified recreational areas, the remedy is expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled. OU3 ecological remedial actions have not yet been implemented. Protectiveness of the OU3 remedy will be evaluated in the next five-year review.

Next Five-Year Review

CERCLA Section 121(c) requires the USEPA to perform a review of remedial actions that result in hazardous substances, pollutants, or contaminants remaining at the Site at least every five years. The purpose of the review is to assure the remedial actions are protective

of human health and the environment. The trigger date for completion of these reviews is five years after initiation of the first remedial action at the Site. The first remedial action at the Bunker Hill Superfund Site started in 1995. Since onsite containment of hazardous substances is part of the Site's Selected Remedy, the first five-year review was completed on September 27, 2000. This second five-year review and report was required to be completed by September 27, 2005; however, due to the 30-day extension of the public comment period, the final report was delayed by approximately one month.

The next review (the third five-year review) of the Bunker Hill Superfund Site will be conducted within five years of the completion date of this second five-year review report. The third five-year review report will cover all remedial work, monitoring, and O&M activities conducted at the Site. In addition, as stated in the 2002 OU3 ROD, the USEPA will continue to evaluate Coeur d'Alene Lake conditions in the next and future five-year reviews.

References

CH2M HILL. 1999. *Bunker Hill Hillsides Revegetation Conceptual Plan and Monitoring Plan, Final, Bunker Hill Superfund Site, Kellogg, Idaho*. Work Assignment No. 31-68-0NX9, USEPA Contract No. 68-W9-0031, CH2M HILL Project No. 150981.FD.04. Prepared for the USEPA. December 16, 1999. (See Table ES-6).

Golder Associates, Inc. 2001. Review of Bank Stabilization Survey Data, Lower Coeur d'Alene River, Dudley, Idaho. Prepared for the IDEQ. February 28, 2001. (See Table ES-7 of this report).

Liverman, Earl, USEPA. 2004. Personal communication via email regarding Elk Creek Pond. December 2004. (See Table ES-7 of this report).

McCulley, Frick, and Gillman (MFG). 1992a. *Bunker Hill Superfund Site, Feasibility Study Report*.

MFG. 1992b. *Bunker Hill Superfund Site, Remedial Investigation Report*.

National Research Council (NRC). 2005. Prepublication Report – Superfund and Mining Megasites – Lessons from the Coeur d'Alene River Basin. Committee on Superfund Site Assessment and Remediation in the Coeur d'Alene River Basin, Board on Environmental Studies and Toxicology, Division on Earth and Life Studies. July 2005.
<http://www.nap.edu/books/0309097142/html/>

U.S. Environmental Protection Agency (USEPA). 2002. *Record of Decision, Bunker Hill Mining and Metallurgical Complex Operable Unit 3 (Coeur d'Alene Basin), Shoshone County, Idaho*. USEPA DCN: 2.9. September 2002.

USEPA. 2001a. *Record of Decision Amendment: Bunker Hill Mining and Metallurgical Complex Acid Mine Drainage, Smelterville, Idaho*, United States Environmental Protection Agency. USEPA/541/R-02/105. USEPA ID: IDD048340921. December 10, 2001.

USEPA. 2001b *Coeur d'Alene Basin Remedial Investigation/Feasibility Study, Feasibility Study Report, Final*. Prepared by URS-Greiner Inc. and CH2M HILL. October 2001.

USEPA. 2001c. *Coeur d'Alene Basin Remedial Investigation/Feasibility Study, Remedial Investigation, Final (Revision 2)*. Prepared by URS-Greiner Inc. and CH2M HILL. October 2001.

USEPA. 2000a. *First 5-Year Review of the Non-Populated Area Operable Unit, Bunker Hill Mining and Metallurgical Complex, Shoshone County, Idaho*. USEPA Report. September 28, 2000.

USEPA. 2000b. *Bunker Hill Populated Areas Operable Unit First Five Year Review Report*. Seattle, WA. USEPA Region 10. September 27, 2000.

USEPA. 1998. *Explanation of Significant Differences for Revised Remedial Actions at the Bunker Hill Superfund Site OU2, Shoshone County, Idaho*. USEPA/ESD/R10-98/037. USEPA ID: IDD048340921. April 1998.

USEPA. 1996a. *Amendment to the Record of Decision for the Bunker Hill Mining and Metallurgical Complex (Non-Populated Areas) Superfund Site*. USEPA/AMD/R10-96/146. USEPA ID: IDD048340921. September 3, 1996.

USEPA. 1996b. *Explanation of Significant Differences for Revised Remedial Actions at the Bunker Hill Superfund Site, Shoshone County, Idaho*. January 1996.

USEPA. 1992. *Record of Decision, Bunker Hill Mining and Metallurgical Complex [Non-Populated Area], Shoshone County, Idaho*. September 1992. (Although not in the title, this ROD addressed the non-populated areas of the site, as well as those aspects of the populated areas that were not addressed in the 1991 OU1 ROD)<http://www.epa.gov/superfund/sites/rods/fulltext/r1092041.pdf>

USEPA. 1991. *Record of Decision, Bunker Hill Mining and Metallurgical Complex Residential Soils Operable Unit, Shoshone County, Idaho*. August 1991.
<http://www.epa.gov/superfund/sites/rods/fulltext/r1091028.pdf>

USEPA and Idaho Department of Environmental Quality (IDEQ). 2003. *State Superfund Contract Amendment for Time-Critical Acid Mine Drainage Removal Activities*. April 2003.

Table ES-1. Summary of ROD Activities and Remedial Actions – Operable Unit 1			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Soil Remediation	Upstream Mining Group (UMG)	1994-Present	Partially excavate contaminated soils and install clean soil barriers or other protective barriers (e.g., gravel and asphalt) on residential yards, commercial properties, and rights-of-way in OU1. Ensure proper disposal of contaminated soils in the Page Repository. From 2002-2004, the USEPA and the IDEQ took over a portion of the UMG's Consent Decree work obligations. The USEPA and the IDEQ expect UMG to fully comply with the Consent Decree (CD) requirements from 2005 forward.
Hillside Sloughing and Stabilization	IDEQ, USEPA	1995-2004	Stabilize hillside areas adjacent to residential yards that are sloughing contaminated soils into residential yards.
Air Monitoring	UMG, USEPA,	1995-Present	Monitor air quality through personal monitors used by workers at yard remediations and other monitoring stations in the Box. OU1 monitoring stations were discontinued in 2003 but personal monitors are continuing to be used by workers at yard remediations.
House Dust Monitoring	IDEQ, USEPA	1988-Present	Monitor house dust lead concentrations, lead loading rates, and dust loading rates through vacuum bags and dust mats as residential soil remediation is completed.
Interior Cleaning Pilot Project	IDEQ, USEPA	2000	As follow-up to the 1990 interior cleaning pilot project, completed a second pilot project to assess the long-term effectiveness and costs for a one-time interior cleaning program in a community where soil remediation has been completed (i.e., Smelterville).
Lead Health Intervention Program (LHIP)	PHD	1985-present	Provide health education services to local residents, including annual blood lead screening and nurse follow-up visits for children with elevated blood lead levels to help identify and reduce exposures.
Institutional Controls Program (ICP)	PHD	1995-Present	Ensure that protective barriers are maintained over time and provide services to local residents, including vacuum loan program and free disposal locations for contaminated residential soils.

Table ES-2. Summary of Issues - Operable Unit 1		
Issues	Affects Protectiveness (Y/N)	
	Current (now to 1 year)	Future (>1 year)
Right-of-Way (ROW) Recontamination: ROW recontamination appears to be increasing at a slow rate.	N	Y
Hillside Sloughing: Contamination from eroding hillsides adjacent to residential areas was identified as a potential source of recontamination. Most of these hillsides have been addressed, but there could still be some that need to have appropriate controls installed.	N	Y
One-time Interior Cleaning: Results of two pilot studies indicate that house dust lead concentrations return to pre-remediation levels within one year of cleaning, regardless of the cleaning method. Recent data confirm that house dust lead concentrations have achieved the community mean of 500 mg/kg and the number of homes exceeding 1,000 mg/kg lead in house dust is declining.	N	Y
Institutional Controls Program (ICP): Permanent funding of the ICP is needed to ensure success of the remedy.	N	Y
Disposal/ICP Repository: Long-term repository needs will require additional disposal capacity.	N	Y
Infrastructure: Infrastructure maintenance and improvements remain an issue. The remedy relies on functioning infrastructure to be sustainable. Resources to repair and install infrastructure have been difficult to secure by local governments.	Y	Y

Table ES-3. Summary of Recommendations and Follow-Up Actions – Operable Unit 1

Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Right-of-Way (ROW) Recontamination: Conduct ROW sampling and analysis to determine if lead concentrations have remained stable.	IDEQ	USEPA	12/2009	N	Y
Hillside Sloughing: Evaluate unaddressed hillside sloughing areas adjacent to residential yards and determine if control measures are needed.	IDEQ, USEPA	IDEQ, USEPA	12/2006	N	Y
Mine Dumps: Assess new information regarding erosion or access concerns for mine dumps on hillsides adjacent to residential yards.	IDEQ, USEPA	IDEQ, USEPA	12/2006	N	Y
One-time Interior Cleaning: Evaluate need for implementation of the interior cleaning component of the remedy. Continue monitoring house dust concentrations annually as soil remediation is completed.	IDEQ, USEPA	USEPA	12/2006	N	Y
Lead Health Intervention Program (LHIP): Continue offering services, including blood lead screening services and follow-up nurse visits to help identify and mitigate potential exposure pathways.	PHD	IDEQ, USEPA	12/2009	N	Y
Institutional Controls Program (ICP): Continue offering ICP programs, including the vacuum loan program. Secure permanent funding for the ICP as required by the 1994 Consent Decree.	PHD, Upstream Mining Group (UMG)	IDEQ, USEPA	12/2007	N	Y
Disposal/ICP Repository: Address long-term disposal needs as part of permanent funding for ICP, as required by the 1994 Consent Decree. Evaluate need for snow disposal area.	PHD,UMG	IDEQ, USEPA	12/2007	N	Y

Table ES-3. Summary of Recommendations and Follow-Up Actions – Operable Unit 1					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Infrastructure: Repair and regularly maintain existing infrastructure (e.g., failing roads).	Local Governments	IDEQ, PHD, USEPA	12/2009	Y	Y
Identify funding and other resources for infrastructure maintenance and improvements to protect the remedy, such as storm water controls.	Local Governments, IDEQ, USEPA	IDEQ, PHD, USEPA	12/2009	Y	Y

Table ES-4. Summary of ROD Activities and Remedial Actions – Operable Unit 2			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Institutional Controls Program (ICP)	IDEQ	Ongoing	Same as the ICP program implemented in Operable Unit 1.
Health and Safety during Remediations	IDEQ , PRPs, USEPA	Ongoing	Ensure that remedial actions are implemented safely and in accordance with applicable regulations and guidance.
Operation and Maintenance (O&M) Plan, Operation and Maintenance	IDEQ , PRPs, USEPA	Ongoing	Ongoing monitoring, routine site inspections, and any necessary repair of completed remedial actions. Preparation of O&M Plans.
Hillsides	USEPA	1990-1994 1996 2000-2005	Hillside terracing and vegetation programs by the Potentially Responsible Parties (PRPs). Initiation of government-led efforts for hillsides revegetation. Revegetation of hillsides included hydroseeding, application of soil amendments, and planting of hardwood trees and shrubs. Annual evaluation and performance monitoring, maintenance as needed. Development of long-term O&M Plan and performance standards. Access controls maintained in some areas, but an issue in many areas.
Grouse Gulch	PRP	1995-1997 1997-2005	The Bunker Limited Partnership (BLP) removed approximately 1,200 cubic yards of tailings above the uppermost gabion structure from locations closest to the creek and disposed in the Central Impoundment Area (CIA). A new gabion dam was constructed in the lower reaches. Access roads were improved to enable access to gabion structures. The Wyoming mine dump located near the creek was buttressed at its base to minimize potential for erosion. Approximately 2,000 cubic yards of material were removed and disposed of at the CIA. Remedial action has not required maintenance since its completion in 1997. Shoshone County is responsible for cleaning out Grouse Gulch sediment basins to help control flooding associated with Grouse Creek in Smelterville.
Government Gulch	USEPA	1996-1998 2000-2005	Demolition of industrial complex structures and stacks (e.g., Lead Smelter, Zinc Plant, and Phosphoric Acid Plant). Consolidation of debris in Smelter Closure. Reconstruction of lower portion of Government Creek. Enyeart Lumber Yard capped, as well as other discrete areas in lower Government Gulch. Maintenance and rebuilding of 800 lf of upper creek channel. Recapping of disturbed areas planned for 2006. Riparian corridor planting. No further maintenance has been required.

Table ES-4. Summary of ROD Activities and Remedial Actions – Operable Unit 2			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Upper Magnet Gulch	USEPA	1995-1999 2000-2005	Source removal action, reconstruction of creek channel, revegetation. No maintenance has been required since completion of remedial action in 1999.
Deadwood Gulch	USEPA	1995-1998 2001 2000-2005	Source removal action, stabilize and reconstruct creek channel, revegetation. Riparian corridor planting of the Deadwood Creek conducted in 2001. No maintenance has been required since completion of majority of remedial action in 1998.
Railroad Gulch	USEPA	1997 2000-2005	Reconstruction of creek channel and capping. No maintenance has been required since completion of the remedial action in 1997.
Smelterville Flats – North of I-90	USEPA	1996-1998 2000-2004	Source removal action, capping, revegetation, and stream bank stabilization. Riparian plantings of trees and shrubs. Noxious weed control programs conducted periodically from 2001 through 2005 by the USACE. S&P Truck Stop area capped by the PRPs in 2001; was re-remediated by the USACE later in 2001. City/Gun range road east of the S&P Truck Stop capped in 2004.
Smelterville Flats – South of I-90	USEPA	1997-1998 2001 2000-2005	Source removal action, re-grading, capping, and surface water management. Improvements to surface water runoff control implemented in 2001, consisting of a vegetated swale and storm drain pipe. Recapped North Idaho Recycle Yard. No maintenance has been required since completion of the remedial action.
Central Impoundment Area (CIA)	USEPA	1995-2000 2000-2005	Consolidation of Mine Operations Area (MOA) demolition debris and contaminated material from various source removal actions, geomembrane cover system, surface water drainage systems, capping CIA side slopes, revegetation. Installed perimeter fencing to limit access to the CIA, final-graded access roads, and de-mobilized construction contractor in November 2000. Annual inspections and O&M ongoing.

Table ES-4. Summary of ROD Activities and Remedial Actions – Operable Unit 2			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Page Pond	PRP (UMG)	1997-2000 2000	Removal of West Beach tailings. Tailings removal, capping, revegetation, surface water controls. Limited monitoring and O&M activities ongoing, but no additional remedial actions in Page Pond since 2000.
Industrial Complex: Smelter Closure Area and Principal Threat Materials (PTM) Cell	USEPA	1995-1998 2004-2005	Demolition of smelter structures, demolition and haul off Zinc Plant debris to smelter closure area, infilling demolition debris with slag, consolidation of source removal material at closure area, construction of PTM cell, placement of PTMs and closure of cell, geomembrane cover system, surface water management, revegetation, perimeter fencing. Remedial action was complete in 1998. In 2004, a gravity collection and conveyance system for drain water was designed to replace a pumped system. System was constructed in 2005. Ongoing monitoring of well system for smelter closure observational approach. Minor routine O&M.
Industrial Complex: Borrow Area Landfill	IDEQ, USEPA	1997-1998 2000-2001 2002-2005	Borrow Area constructed to provide clean fill for site remediations. Received waste from lower industrial landfill and other miscellaneous site waste below PTM action level. Landfill closed; grading, surface water management, soil cover, revegetation, and settlement monitoring points. No maintenance has been required since closure of Borrow Area.
Industrial Complex: Area 14	USEPA	1997-1999 2005	Two sedimentation ponds (Gilges Pond and Sweeney Pond) were excavated and backfilled. Phased remedial design and remedial action to be initiated in 2006.
Mine Operations and Boulevard Areas	USEPA	1995 1997 2000-2005	MOA: Demolition of structures, source removal actions, site grading, capping, and revegetation. Boulevard: Source removal action, replacement with clean soil, re-grading, surface waste management, revegetation. No further remedial work has been conducted. No maintenance has been required since completion of these remedial actions.

Table ES-4. Summary of ROD Activities and Remedial Actions – Operable Unit 2			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Central Treatment Plant (CTP)	USEPA	1994-1995	Construction of CTP pond adjacent to McKinley Avenue.
		1996-1997	Studies to prioritize maintenance needs and to optimize operation of CTP.
		1997	Miscellaneous O&M, construction of direct discharge line from mine to CTP, ICP capping on CTP property.
		2001-Present	In 2001-2002, new direct feed mine water pipeline constructed from the Kellogg Portal to the CTP aeration basin. Emergency repairs and upgrades to the CTP and lined pond completed.
Bunker Creek	USEPA	1997	Source removal, reconstruction of creek channel, revegetation, and culverts for road crossings.
		2001-2002	Riparian plantings along the creek corridor, ICP capping in area west of CIA closure, and construction of emergency overflow. Fence was installed between the Creek and the Union Pacific Railroad (UPRR) ROW/Trail in 2002. No maintenance has been required since completion of remedial action. The USEPA and the Department Idaho Fish and Game (IDFG) to address beaver dam, and monitor impact on remedy.
Union Pacific Railroad Right-of-Way in the Box (Box UPRR ROW) (excluding OU3 Trail of the Coeur d'Alenes)	PRP (UPRR)	1995-2000 2000-Present	Source removals, re-use of decontaminated materials, capping with clean barriers in accordance with 1995 Consent Decree. Remediation of the portions of the UPRR ROW adjacent to the CIA haul road and verification sampling (2000). Certification of the UPRR remedial action and incorporation of the ROW into the ICP (2001). Remaining pieces of government response areas remediated and old fuel bulk plant on the UPRR ROW in Kellogg removed and remediated (2002-2004). Portions of the UPRR ROW paved with an asphalt path. In 2005, the USACE remediated several discrete areas: one area east of Ross Ranch, and one haul road shoulders south of TCI building. The USACE will also remediate several bare patches along trail and fence line in late 2005 or early spring 2006. Inspection/monitoring and O&M activities ongoing.

Table ES-4. Summary of ROD Activities and Remedial Actions – Operable Unit 2			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Milo Gulch and Reed Landing	IDEQ USEPA	1995-2000 2005-Ongoing	Milo Creek: source removal, water diversion dam and pipeline on the main stem of Milo Creek. Remedial action of lower Milo Gulch essentially complete in 2000. Reed Landing: Re-grading to stable slope, disposal at Guy Caves, construction of reinforced concrete emergency overflow channel. Upper Milo basin requires additional remediation (pending) per the 2001 OU2 Record of Decision (ROD) Amendment. The USEPA currently conducting remedial design of West Fork Diversion. Routine maintenance ongoing.
A-4 Gypsum Pond	PRP (SMC)	1996-2000 2001-Present	Construction of run-on ditches along up-gradient perimeter, removal of upper portion of existing north perimeter embankment and re-graded the downstream face of the embankment, rerouted Magnet Creek over the A-4 Gypsum Pond and then excavated and lowered Magnet Gulch channel down to the native soils at the floor of the tailings pond, construction of lined drainage channel and outfall works around the pond near eastern perimeter to convey drainage from Deadwood Gulch to Bunker Creek, installed seepage barrier along north perimeter of McKinley Pond and a new sealed culvert under McKinley Avenue from McKinley Pond. Installation of a French drain along the toe of the north dike. Completed construction of a primary drainage channel and associated outfall works at the extreme west side of the A-4 closure area to convey perennial and seasonal flows that originate from the upper reaches of Magnet Gulch, infilled existing solution cavities, plugging and partial removal of the former decant piping and re-grading of the impounded gypsum, construction of runoff control ditches near the down-gradient perimeter of the closure area to intercept and divert localized drainage to either Magnet Gulch or Deadwood Gulch channels, cover soil was placed on the A-4 complex at numerous times following remediation work and in 2002 soil was applied to the west end of the A-4 in association with the completion of the Magnet Gulch channel, in 2003 SMC applied cover soil over 75 percent of the A-4 to replace re-contaminated cover-soil, and vegetation was established on site following soil placement in 1996. The goal at that time was to minimize water infiltration into the soil cap by increasing evapotranspiration. However, the vegetation in much of the area was eliminated when the cover soil was replaced again in 2003. Final seeding completed in 2005. Final vegetative performance will be a function of O&M and the responsibility of the Stauffer Management Company (SMC).
South Fork Coeur d'Alene River Removal and Stabilization Project	IDEQ , USEPA	2000-2004	Removal and stabilization project: contaminated floodplain sediments excavated and hauled for disposal, eastern and western halves of the river reach reconstructed and revegetated, and upland areas reseeded.

Table ES-4. Summary of ROD Activities and Remedial Actions – Operable Unit 2			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Miscellaneous Box Projects	IDEQ, USEPA	1998-Present	Variety of miscellaneous projects in support of larger remedial actions in OU2 including City of Smelterville fencing and road and shoulder paving, remediation of Airport road shoulders and area residences, clean water supply to users of Hangaard Arena, McKinley Avenue capping, remediation of Pinehurst Golf Course parking lot, surrounding areas of Kellogg Project office, east Smelterville private properties, residential properties and ROWs adjacent to UMG-responsible properties, and a number of access controls in the Box.
OU2 Water Quality Monitoring	IDEQ, USEPA	1996-Present	Groundwater and surface water monitoring at several locations throughout OU2 to provide water quality data during remedial action implementation and provide data for post-implementation Phase I remedial action effectiveness.

Table ES-5. Summary of Issues - Operable Unit 2		
Issues	Affects Protectiveness (Y/N)	
	Current (now to 1 year)	Future (>1 year)
OU2 Institutional Controls Program (ICP) Funding: Permanent funding of the ICP is needed to ensure success of the remedy. At this time, permanent funding for the OU2 ICP has not been secured. Disposal/ICP Repository: Long-term repository needs will require additional disposal capacity. ICP Database: Type and depth of barrier and contamination left behind for OU2 areas needs to be incorporated into ICP database to support long-term ICP management.	N N N	Y Y Y
Hillsides Hillsides Access Control: Use of the hillsides by unsanctioned off-road vehicles may result in a potential human health risk from residual contamination and is producing wheel ruts that could lead to detrimental erosion.	N	Y
Gulches Biological Monitoring: Elevated metals concentrations were observed in Deadwood, Government and Magnet Gulches during biomonitoring.	N	Y
Smelterville Flats Biological Monitoring: Elevated metals concentrations were observed in North of I-90 areas during biomonitoring.	N	Y
Central Impoundment Area (CIA) State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Lack of a SSC amendment prevents full implementation of the 2001 OU2 ROD Amendment, including installation of a new lined sludge pond on the CIA (if required).	Y	Y
Page Pond North Channel: The North Channel revegetated area has not survived the initial hydroseeding and tailings are exposed. This channel is near the Trail of the Coeur d'Alenes and the South Fork Sewer District's lift station.	Y	Y

Table ES-5. Summary of Issues - Operable Unit 2		
Issues	Affects Protectiveness (Y/N)	
	Current (now to 1 year)	Future (>1 year)
Remedial Effectiveness Monitoring Program: Possible issues in the existing Page Pond monitoring program, which were noted in the first five-year review, have not been further analyzed.	N	Y
Repository Vehicle Decontamination: Additional vehicle decontamination procedures have not been implemented at the repository.	Y	Y
Biological Monitoring: Mitigative measures should be considered for wetland loss at West Page Swamp due to expansion of Page Repository.	N	Y
Remedy Implementation: The remedy has not been fully implemented and no remedial actions have been conducted since 2000.	Y	Y
Industrial Complex		
State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Lack of a SSC amendment between the USEPA and the State of Idaho prevents full implementation of the 2001 OU2 ROD Amendment that would upgrade the CTP where Smelter Closure flows are treated.	Y	Y
Central Treatment Plant (CTP)		
State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Lack of a SSC amendment prevents full implementation of the 2001 OU2 ROD Amendment, including control of AMD into the CTP, additional CTP upgrades, and placing a new lined sludge pond on the CIA .	Y	Y
AMD Discharge from Reed and Russel: Control of AMD discharge at the Reed and Russel adits.	Y	Y
Bunker Creek		
State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Lack of a SSC amendment between the USEPA and the State of Idaho prevents full implementation of the 2001 OU2 ROD Amendment. Until the full 2001 OU2 ROD Amendment is implemented, cleanup of contaminated sediments in the Bunker Creek channel caused from mine and tributary flows and minor CTP upsets is not feasible.	Y	Y
Ambient Water Quality Standards (AWQC): Bunker Creek base flows do not currently meet AWQC.	Y	Y
Beaver Dam: Presence of the beaver dam may impact channel stability, flow paths, and infiltration.	N	Y

Table ES-5. Summary of Issues - Operable Unit 2		
Issues	Affects Protectiveness (Y/N)	
	Current (now to 1 year)	Future (>1 year)
Union Pacific Railroad Right-of-Way in the Box (Box UPRR ROW) Barrier Erosion: Motor vehicle access on gravel portions of the Box UPRR ROW results in erosion of barrier layers.	N	Y
Milo Gulch State Superfund Contract for 2001 OU2 ROD Amendment: Lack of a SSC amendment between the USEPA and the State of Idaho prevents full implementation of the 2001 OU2 ROD Amendment, including surface water mitigation work identified for Milo Creek. Reed Landing Adit Flows: Near Reed Landing, adit drainage flows into an old surface water channel and into the buried 4'x4' culvert, and eventually daylights onto a soil slope. Slope instability or erosion may occur as a result of this flow. System Requirements: System requires periodic maintenance to control function.	Y N N	Y Y Y
OU2 Biological Monitoring Wildlife Tissue Concentrations: Wildlife tissue metal concentrations appear to continue to be elevated in post remediated areas. Potential Wetland Loss: Mitigative measures should be considered for wetland loss at West Page Swamp due to expansion of Page Repository. Vegetation: Vegetation supportive of local bird population needs additional time to recover. Gulch Monitoring: Further examination and monitoring at Government, Magnet, and Deadwood Gulches is required to evaluate whether post-remediation soil lead concentrations are above levels toxic to songbirds and to determine trends in songbird lead body burdens. Sediment Lead Levels: Sediment lead levels within the Page Pond area appear to continue to be above toxic threshold levels to waterfowl. Small Mammals: Metal concentration levels in OU2 small mammals continue to be elevated above reference samples and are indicative of elevated exposure. Soil Sampling: Soil samples have not been routinely collected in post-remediated areas.	N N N N N N N	Y Y Y Y Y Y Y

Table ES-6. Summary of Recommendations and Follow-Up Actions – Operable Unit 2					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
OU2 Institutional Controls Program (ICP)					
Funding: Create irrevocable trust to provide consistent cash flow for ICP operation into perpetuity.	IDEQ	IDEQ, USEPA	12/2009	N	Y
Disposal/ICP Repository: Establish long-term disposal plan for ICP-generated wastes.	IDEQ, PHD, USEPA	USEPA	12/2006	N	Y
ICP Database: Collect information for ICP property database.	IDEQ, PHD, USEPA	IDEQ	12/2007	N	Y
Barrier Maintenance: Identify funding and other resources for infrastructure maintenance and improvements to protect the remedy, such as storm water controls.	Local Governments, IDEQ, USEPA	USEPA	6/2009	N	Y
Hillsides					
Hillsides Access Controls: Assess the need for additional access control to hillsides and gulches. Inform the public of the adverse impacts resulting from off-road use.	IDEQ, USEPA	IDEQ, USEPA	9/2006	N	Y
Gulches					
Biological Monitoring: Conduct additional soil sampling for metals concentrations in areas where biomonitoring is occurring.	USFWS	USEPA	10/2006	N	Y
Gulch Phase I Remedial Action Effectiveness Monitoring: Complete evaluation of the Phase I remedial action effectiveness monitoring data and revise the remedial action effectiveness monitoring plan as appropriate.	IDEQ, USEPA	IDEQ, USEPA	7/2006	N	Y
Smelterville Flats					
Biological Monitoring: Conduct additional soil sampling for metals concentrations in north of I-90 areas where biomonitoring is occurring.	USFWS	USEPA	10/2006	N	Y

Table ES-6. Summary of Recommendations and Follow-Up Actions – Operable Unit 2					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Smelterville Flats Phase I Remedial Action Effectiveness Monitoring: Complete evaluation of the Phase I remedial action effectiveness monitoring data and revise the remedial action effectiveness monitoring plan as appropriate.	IDEQ, USEPA	IDEQ, USEPA	7/2006	N	Y
Central Impoundment Area (CIA) State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Continue, with the assistance of the State of Idaho, to pursue viable solutions to the SSC impasse. Once a solution is achieved, continue with implementation of the 2001 OU2 ROD Amendment. CIA Phase I Remedial Action Effectiveness Monitoring: Complete evaluation of the Phase I remedial action effectiveness monitoring data and revise the remedial action effectiveness monitoring plan as appropriate.	IDEQ, USEPA IDEQ, USEPA	USEPA IDEQ, USEPA,	12/2007 7/2006	Y N	Y Y
Page Pond North Channel: Evaluate area that did not survive initial hydroseeding. Take action to re-establish vegetation and/or place a soil barrier over exposed tailings. Ensure access is limited to trail users, if appropriate. Remedial Effectiveness Monitoring Program: Evaluate possible issues in existing Page Pond monitoring program. Review recommendations in 1999 monitoring program memorandum (CH2M HILL, 1999). Finalize monitoring program elements. Repository Vehicle Decontamination: Evaluate appropriate decontamination improvements and put measures in place to reduce the potential for recontamination. Biological Monitoring: Evaluate biological monitoring results and impacts related to Page Repository expansion. Remedy Implementation: Complete Page Pond remedial actions.	UMG IDEQ, UMG, USEPA IDEQ, PHD, UMG IDEQ, UMG, USEPA UMG	IDEQ, USEPA IDEQ, USEPA IDEQ, PHD, USEPA IDEQ, USEPA IDEQ, USEPA	4/2006 4/2006 4/2006 4/2006 12/2006	Y N Y N Y	Y Y Y Y Y

Table ES-6. Summary of Recommendations and Follow-Up Actions – Operable Unit 2					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Industrial Complex Area 14 Remediation: Initiate phased site characterization, remedial design and remedial action at Area 14. State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Continue, with the assistance of the State of Idaho, to pursue viable solutions to the SSC impasse. Once a solution is achieved, continue with implementation of the 2001 OU2 ROD Amendment.	USEPA IDEQ, USEPA	USEPA USEPA	3/2006 12/2007	N Y	Y Y
Central Treatment Plant (CTP) State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Continue, with the assistance of the State of Idaho, to pursue viable solutions to the SSC impasse. Once a solution is achieved, continue with implementation of the 2001 OU2 ROD Amendment. AMD Discharge from Reed and Russel: Work with mine owner to address AMD conveyance issues resulting in discharge of AMD at these locations.	IDEQ, USEPA USEPA	IDEQ, USEPA USEPA	12/2007 12/2007	Y Y	Y Y
Bunker Creek State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Continue, with the assistance of the State of Idaho, to pursue viable solutions to the SSC impasse. Once a solution is achieved, continue with implementation of the 2001 OU2 ROD Amendment. Bunker Creek Phase I Remedial Action Effectiveness Monitoring: Complete evaluation of the Phase I remedial action effectiveness monitoring data and revise the remedial action effectiveness monitoring plan as appropriate. Beaver Dam: Coordinate with Idaho Department of Fish & Game (IDFG) on appropriate measures to address beaver presence.	IDEQ , USEPA IDEQ, USEPA IDEQ ,USEPA	USEPA IDEQ, USEPA IDEQ, USEPA	12/2007 7/2006 12/2005	Y N N	Y Y Y

Table ES-6. Summary of Recommendations and Follow-Up Actions – Operable Unit 2					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Union Pacific Railroad Right-of-Way in the Box (Box UPRR ROW) Barrier Erosion: Continue oversight monitoring of UPRR's operation and maintenance (O&M) program.	IDEQ, PHD	IDEQ, PHD	9/2010	N	Y
Milo Gulch State Superfund Contract (SSC) for 2001 OU2 ROD Amendment: Continue, with the assistance of the State of Idaho, to pursue viable solutions to the SSC impasse. Once a solution is achieved, continue with implementation of the 2001 OU2 ROD Amendment. Reed Landing Adit Flows: Continue discussions/negotiations with the mine owner to redirect the adit flows in the Milo drainage to the CTP for treatment. Permanent Access: Secure permanent access for system maintenance.	IDEQ, USEPA USEPA IDEQ, USEPA	USEPA USEPA USEPA	12/2007 12/2005 90/2010	Y N N	Y Y Y
A-4 Gypsum Pond Vegetative Standard: Review performance of vegetative standard at the next five-year review. It is currently estimated that this standard will be met in 2008 or 2009.	SMC	IDEQ, USEPA	9/2010	N	Y
South Fork Coeur d'Alene River Removal and Stabilization Project Observational Monitoring: Continue informal observational monitoring of SFCDA River removal and stabilization project sites, especially after flood events. Will also include as part of Smelterville Flats Phase I Remedial Effectiveness Monitoring.	IDEQ	USEPA	Ongoing	N	Y
OU2 Phase I Water Quality Monitoring Environmental Monitoring: Complete revision of OU2 Environmental Monitoring Plan and implement	IDEQ , USEPA	USEPA	3/2006	N	Y

Table ES-6. Summary of Recommendations and Follow-Up Actions – Operable Unit 2					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Conceptual Site Model: Complete revised OU2 Conceptual Site Model	IDEQ, USEPA,	USEPA	12/2006	N	N
Trend Analysis: Complete statistical trend analysis of OU2 Phase I water quality monitoring data.	IDEQ, USEPA	USEPA	12/2006	N	Y
Phase I Assessment: Complete assessment of OU2 Phase I remedial actions with respect to water quality.	IDEQ, USEPA	USEPA	7/2007	N	Y
OU2 Biological Monitoring					
Potential Wetland Loss: Mitigative measures should be considered for wetland loss at West Page Swamp due to expansion of Page Repository.	UMG, USEPA	IDEQ, PHD, USEPA	12/2006	N	Y
Environmental Monitoring Plan: Incorporate biological monitoring components into revised OU2 Environmental Monitoring Plan. The following previously established activities are recommended for continued biomonitoring within OU2: <ul style="list-style-type: none"> • Waterfowl blood collection • Songbird blood collection • Small mammal metals evaluation • Fish metals evaluation • Aquatic invertebrate collection • Breeding Bird Surveys • Monitoring Avian Productivity and Survivorship (MAPS) • Page/Swamp Waterfowl Surveys • Page Pond wetland vegetation mapping In addition, the following activities are recommended to be included in future biomonitoring within OU2: <ul style="list-style-type: none"> • Songbird histopathology • Surface soil/sediment sampling • Terrestrial invertebrate collection and/or invertebrate soil toxicity testing • Amphibian population monitoring 	USEPA	USEPA	9/2005	N	Y

Table ES-7. Summary of Removal Actions – Operable Unit 3

Site Name	Responsible Entity	Dates of Action	Description of Action
Residential and Common-use Areas			
Residential Yards	IDEQ ,USEPA	1997-2002	Partially removed lead-contaminated soils and replaced with clean soil barrier and or other protective barriers (e.g., clean gravel). From 1997-2002, actions were completed at 119 residential yards.
Schools/Daycares	USEPA	1997-2001	Partially removed lead-contaminated soils and replaced with clean soil or other protective barriers (e.g., clean gravel). Actions were completed at 7 schools and daycares. The Silver Hills Middle School was started in 1997 and additional work was completed in 1998, 2001, and 2002 due to the extremely large property size.
Private Drinking Water	USEPA	1997-2002	Provided alternate water supply to 28 residences on contaminated private wells. Alternate supplies included bottled water for 11 homes, end-of-tap water treatment (water filters) for 5 homes, and municipal water hookup for 12 homes.
Canyon Creek			
Standard Mammoth Facility	ASARCO	1997-1998	Removal of tailings with disposal at Woodland Park Repository. Re-graded, stabilized, capped, and revegetated waste rock pile. Removed railroad grade and crossing.
Canyon Creek from Tamarack to below Gem	SVNRT	1997-1998	Time-critical removal of ~127,000 cubic yards (cy) of tailings and contaminated sediment with disposal at the Woodland Park Repository. Soils at removal areas were amended with organic materials, and then revegetated. The stream channel of Canyon Creek was stabilized with bioengineering techniques.
Lower Canyon Creek Floodplain	SVNRT	1997-1998	Time-critical removal of 472,000 cy of tailings and contaminated materials with disposal at the Woodland Park Repository. Soils at removal areas were amended with organic materials, and then revegetated. The stream channel of Canyon Creek was stabilized with bioengineering techniques.
Woodland Park Repository	SVNRT	1997-1998	Construction of an unlined repository for disposal/consolidation of removals along Canyon Creek. Repository contains approximately 600,000 cy of contaminated materials. Repository capped with native soils and revegetated.
Gem Portal Pilot	BLM , SVNRT, USEPA	2000-Present	Pilot system created by Asarco (10 gallons per minute) for treatment of drainage from the Gem Portal. Continue to Evaluate Gem Portal Pilot Water Treatment System in context of Canyon Creek Water Treatment Work.

Table ES-7. Summary of Removal Actions – Operable Unit 3			
Site Name	Responsible Entity	Dates of Action	Description of Action
Ninemile Creek			
Interstate Tailings Removal	Hecla	1992-1993	Removal of tailings adjacent to East Fork Ninemile Creek (EFNMC) with consolidation to a nearby uphill area. Installation of straw bales along perimeter of tailings for erosion control.
Interstate Mill Site	IDEQ ,SVNRT ,	1998	Non time-critical removal of ~60,000 cy of tailings, mill debris, and contaminated sediments from the mill site and from EFNMC for 1,000 feet downstream. Disposal at an onsite repository. EFNMC stabilized with bioengineering structures in removal areas.
Success Mine/Mill Tailings and Waste Rock	Hecla	1993	Time-critical removal action included relocation and riprap armoring for ~1,600 feet of EFNMC channel; relocation of streamside tailings; placement of in-stream structures for energy dissipation; capping of tailings pile with 1-foot-thick overburden rock; installation of up gradient groundwater and surface water diversions.
Success Mine Site Passive Treatment	IDEQ, SVNRT USEPA ,	2000-Present	Contaminated groundwater diverted by a subsurface grout wall (approximately 1,350 feet in length) to a treatment vault. Groundwater treated using apatite.
East Fork Ninemile Creek Floodplain	IDEQ, SVNRT	1994	Time-critical removal of ~50,000 cy of flood plain tailings and contaminated sediments with disposal at the Day Rock Repository. Stream reconstruction, riparian stabilization, and revegetation.
Ninemile Creek Floodplain near Blackcloud	Hecla, IDEQ,	1994	Time-critical removal of ~44,000 cy of flood plain tailings and contaminated sediments with disposal at the Day Rock Repository. Stream reconstruction, riparian stabilization, and revegetation.
Day Rock Repository	Hecla, IDEQ, SVNRT	1994	Approximately 94,000 cy of materials from the floodplain removals were placed on top of the existing Day Rock repository and capped with native soils and growth media.
Pine Creek			
Constitution Mine and Mill Site	BLM	1998-Present	Non-time-critical removal included removal of contaminated soils around the mill with disposal at the Central Impoundment Area (CIA), and realignment of East Fork Pine Creek away from the toe of the tailings pile. Most of the tailings and waste rock dump are on private land and have not been addressed to date. In 2002 at the Upper Constitution Site, the BLM installed a pilot mine water treatment bioreactor unit and a groundwater drain above the upper tailings pile. In 2003, the BLM made modification to the system and installed a ground water drain above the bioreactor.

Table ES-7. Summary of Removal Actions – Operable Unit 3			
Site Name	Responsible Entity	Dates of Action	Description of Action
Denver Creek (includes Little Pittsburg, Hilarity, Denver and Mascot Mine)	BLM	1996-2000	Time-critical removal of ~5,200 cy of tailings and contaminated soils associated with the Little Pittsburg Mill. No actions have been conducted on the private portion of the pile. The mouth of Denver Creek has been undergoing stabilization and revegetation by the BLM. Re-grading at the Mascot mine was done by the mine owner, Mascot Mining, in 2002.
Douglas Mine and Mill Site	USEPA	1996-1997	Time-critical removal of two existing tailings impoundments from the flood plain of East Fork Pine Creek. 25,000 cy of contaminated materials were removed and placed into a temporary repository constructed east of Pine Creek Rd. near the mine.
Highland Creek Floodplain	BLM	1999	Time-critical removal of 8,100 cy major discrete tailings deposits along Highland Creek on public lands.
Highland-Surprise Mine/Mill Site (Includes Nevada Stewart Mine)	BLM	1999	Diversion of Highland Creek to reduce erosion of the lower waste rock dump. Most of the facilities at this site are on private land, thus no other actions have been taken to date. In 2001 and 2002, the BLM regarded the upper and lower rock dumps at Highland Surprise. Along with that effort in 2002 the BLM also regarded the Nevada Stewart rock dump.
Sidney (Red Cloud) Mine/Mill Site	BLM	1997-Present	Non-time-critical removal of contaminated soils around the mill foundations with disposal at the CIA; run-on and run-off controls; and improvements to the upstream culvert on Red Cloud Creek to control flow through the site and reduce downstream erosion. Passive treatment of adit drainage with inflow prevention at the Sidney Shaft in Denver Creek. Rock dump re-graded and hydroseeded in 2000 to minimize erosion. Additional stream channel work at the toe of the dump was performed in 2002. In 2001, the BLM started pilot water treatment efforts with the Sidney Red Cloud tunnel mine discharge. In 2003, a pilot bioreactor water treatment system was installed and is continuing to be operated and monitored.
Amy-Matchless Mill Site	BLM	1996-2000	Time-critical removal of ~9,600 cy of tailings and contaminated soils in 1996 and 1997. In 1998, a non-time-critical removal action removed an additional 420 cy of residual tailings. Disturbed area covered with soil and revegetated. Mine adit was closed by backfilling. Waste rock dump re-graded and revegetated.
Liberal King Mine/Mill Site	BLM	1996-2000	Time-critical removal of ~9,400 cy of tailings and contaminated soils. In 1998, 99 cy of mill site tailings and mill wastes were removed from the mill area. In 1999, non time-critical removal of an additional 1,800 cy of tailings, re-grading backfill of a dry adit, import of growth medium, and revegetation. The 2000 actions included extensive grading and planting of riparian vegetation. There are continuing efforts to further revegetate and stabilize the stream reach with additional stream work and plantings of shrubs and trees.

Table ES-7. Summary of Removal Actions – Operable Unit 3			
Site Name	Responsible Entity	Dates of Action	Description of Action
Nabob Mine/Mill Site	BLM	1994-2000	Soil cover over the tailings pile and a portion of mill area; fence to limit access to the mill site and tailings; channel improvements along Nabob Creek to stabilize the channel and prevent erosion of the tailings pile embankment. In 1995, the mine operator seeded and placed soil cover materials over the tailings, but success of the revegetation is limited. In 2000, the BLM started an investigation at the site drilling 20 wells around the pile and mill. Also in 2000, the BLM installed a groundwater cutoff drain above and along the side of the tailings pile. In 2001, the BLM re-graded the Nabob Mid-level rock dump.
Moon Creek Silver Crescent and Charles Dickens Mines	USFS	1998-2000	Non-time-critical removal of ~130,000 cy of tailings, waste rock, contaminated soils, and mill structures, with disposal at an onsite repository. Closure of four adits. Stream relocation and vegetative and structural rehabilitation along approximately 3,300 feet of Moon Creek, and 10 acres of riparian revegetation. .
Elk Creek Pond at Mouth of Moon Creek	SVNRT, USACE, USEPA	1994; 2000	Limited tailings removal in 1994. Clean sand was imported for a recreational beach at this swimming hole. Time-critical removal of 28,000 cy of contaminated sediments and tailings in 2000 (Liverman, 2004).
Upper South Fork Coeur d'Alene River Morning Mine No. 6	Hecla	1989; 2000	Adit drainage directed to subsurface flow, rock-bed filter treatment system. Slaughterhouse Gulch was lined to reduce infiltration through the waste rock pile.
Osburn Flats	SVNRT	1997-1998	Removal of 133,000 cy of tailings and contaminated soil. Project also tested the application of various in situ treatments to tie up metals.
Grouse Creek We Like Mine	BLM	2001-Present	The We Like Mine is in the upper part of Grouse Creek, just above the original Star Mine Rock Dump area. In 2001, the BLM started mine water investigations. In 2003, a pilot bioreactor tank water treatment system was installed and continues to operate.

Table ES-7. Summary of Removal Actions – Operable Unit 3			
Site Name	Responsible Entity	Dates of Action	Description of Action
South Fork Coeur d'Alene River			
South Fork Floodplain Removals	SVNRT	1998	Non-time-critical removals at several areas in the floodplain totaling about 128,000 cy of tailings and contaminated soils.
Elizabeth Park Stream Bank Stabilization	SVNRT	1994; 1999	The project removed 13,585 cy of tailings from the river and used the material to construct a compacted levee over 2,100 feet long on the south river bank. Additionally, 8,027 tons of riprap was placed on the riverbanks to protect them from further erosion. The project also installed in-channel stabilization, aquatic habitat features, and riparian zone enhancements. Work on the project was initiated in September 1994, and completed in May 1995. In 1999, additional river barbs were installed to enhance aquatic life.
Lower Coeur d'Alene River			
Cataldo Mission	Coeur d'Alene Tribe	1995	Removal of ~700 cy of tailings and contaminated soils from traditional campground areas in the vicinity of the Cataldo Mission.
Cataldo Boat Ramp	IDEQ	1996- 1997	Placement of cabled-log bank protection and brush wattling to reduce erosion, and planting of bushes in the vicinity of contaminated soils to discourage human contact with the soils.
Black Rock Slough Trailhead/Highway 3 Crossing	USEPA	2001- 2002	Graded and capped access road and parking area and a trail providing access to Trail of the Coeur d'Alenes; stabilization of 125 feet of eroding river bank.
Killarney Lake Boat Launch	BLM	1991- 1998	Covered contaminated shoreline with geotextile fabric overlain with 12-inch rock. Paved the floodplain area and road, covered edge areas with topsoil and sodded grass, and rebuilt concrete plank boat launch. Provided drinking well and vaulted toilets at the site.
Dudley Bank Stabilization	SVNRT	1999	Pilot bank erosion project to evaluate effectiveness of rock berms in reducing bank erosion caused by piping, or undercutting by boat wake. The project berms were constructed along 625 feet of the south bank and 720 feet of the north bank of the lower CDA River upstream of the Dudley landing. The berms were constructed with large rocks placed on a geotextile fabric to prevent fine-grained soil from being washed out and undermining the berms. The berms were about 2 feet wide and were placed from 7 to 30 feet from the top of the riverbank. Monitoring in late 2000 found that very little bank erosion had occurred and the berms have remained stable (Golder, 2001).
Medimont Bank Stabilization	IDEQ, Soil Conservation Service	1994	Placement of four types of bank erosion control: two with hay bales, two with riprap. Subsequent monitoring indicated that the hay-bale methods were not effective in this portion of the river.

Table ES-7. Summary of Removal Actions – Operable Unit 3			
Site Name	Responsible Entity	Dates of Action	Description of Action
Medimont and Rainy Hill Boat Launches	Asarco, Hecla USFS	1999	Approximately 1,000 cy of clean aggregate capped contaminated parking and access areas, 3- to 6-inch rock placed in shallow areas to discourage children from playing in contaminated sediments, boulders placed to control traffic.
Thompson Lake Boat Launch	USEPA	1999-2000	Removal of contaminated sediments from shoreline, geotextile fabric placed against bank, and overlain with 12-inch rock. Existing unpaved parking lot rebuilt and capped with asphalt, concrete planks installed to provide boat launch.
Anderson Lake Boat Launch	USEPA	1999	Removal of contaminated sediments from shoreline, geotextile fabric placed against bank, and overlain with 12-inch rock. Existing unpaved parking lot rebuilt and capped with asphalt, concrete planks installed to provide boat launch.
Trail of the Coeur d'Alenes (Union Pacific Railroad [UPRR] Wallace-Mullan Branch ROW Removal Actions)	UPRR	2000-2004	The UPRR conducted a removal action and established a recreational trail on the UPRR ROW in OU3. See Section 5.8 of the report for more information on this removal action.

Table ES-8. Summary of Issues - Operable Unit 3 Removal Actions		
Issues	Affects Protectiveness (Y/N)	
	Current (now to 1 year)	Future (>1 year)
Residential Areas: Issues for Residential Area Removal Actions are similar to Remedial Actions for Residential Areas (see Table ES-11).		
Canyon Creek Gem Portal Pilot: Need to evaluate the Gem Portal pilot project in the context of the 2002 OU3 ROD and in light of other water treatment work planned for Canyon Creek and other inputs into Canyon Creek. The Gem Portal pilot project is on BLM land and the BLM is not supportive of this location for a final, long-term treatment system.	Y	Y
Lower Coeur d'Alene River Recontamination at Medimont and Rainy Hill Boat Launches: Gradual recontamination of surface soil at both sites has occurred over the past 5 years due to flooding and high spring flow. Anderson Lake Boat Launch: Keep abreast of Hwy 97 bridge replacement adjacent to boat launch.	N N	Y To Be Determined pending completion of bridge replacement
Trail of the Coeur d'Alenes Harrison Beach Sand: Potential erosion of barrier layer may be occurring based on visual observation. Use Patterns: Potential unauthorized uses may result in increased exposure to contaminants of concern.	N N	Y Y

Table ES-9. Summary of Recommendations and Follow-Up Actions – Operable Unit 3 Removal Actions

Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Residential and Common Use Areas					
Recommendations and Follow-up Actions for Residential Area Removal Actions are similar to Remedial Actions for Residential Areas (see Table ES-12).					
Canyon Creek Standard Mammoth Facility: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program. Canyon Creek from Tamarack to below Gem: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program. Lower Canyon Creek Floodplain: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program. Woodland Park Repository: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program. This includes collection and evaluation of groundwater monitoring data. Gem Portal Pilot: Continue to evaluate pilot treatment system in context of Canyon Creek remedy.	IDEQ, USEPA IDEQ, USEPA IDEQ, USEPA IDEQ, USEPA BLM, USEPA	IDEQ, USEPA IDEQ, USEPA IDEQ, USEPA IDEQ, USEPA USEPA	Based on ROD schedule Based on ROD schedule Based on ROD schedule Based on ROD schedule Ongoing	N N N N Y	N N N N Y
Ninemile Creek Interstate Tailings Removal: Routine monitoring Interstate Mill Site: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program. Success Mine/Mill Tailings and Waste Rock: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	Hecla IDEQ, USEPA IDEQ, USEPA	IDEQ, USEPA IDEQ, USEPA IDEQ, USEPA	Annually Based on ROD schedule 12/2009	N N N	N N Y

Table ES-9. Summary of Recommendations and Follow-Up Actions – Operable Unit 3 Removal Actions					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
<p>Success Mine Site Passive Treatment: Continue to monitor results of the pilot study and incorporate the information into the ongoing Canyon Creek water quality treatability studies and design work.</p> <p>East Fork Ninemile Creek Floodplain: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.</p> <p>Ninemile Creek Floodplain near Blackcloud: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.</p> <p>Day Rock Repository: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.</p>	<p>IDEQ, USEPA</p> <p>IDEQ, USEPA</p> <p>IDEQ, USEPA</p> <p>IDEQ, USEPA</p>	<p>IDEQ, USEPA</p> <p>IDEQ, USEPA</p> <p>IDEQ, USEPA</p> <p>IDEQ, USEPA</p>	<p>12/2009</p> <p>Based on ROD schedule</p> <p>Based on ROD schedule</p> <p>Based on ROD schedule</p>	<p>N</p> <p>N</p> <p>N</p> <p>N</p>	<p>Y</p> <p>N</p> <p>N</p> <p>N</p>
<p>Pine Creek</p> <p>Constitution Mine and Mill Site: Remedial action scheduled for summer 2006. Post RA monitoring required as follow-up. Continue to monitor and operate the pilot water treatment unit.</p> <p>Denver Creek (Includes Little Pittsburg, Hilarity, Denver Mine, and Mascot Mine): Tailings near the confluence with Pine Creek on private land remains and needs to be evaluated in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program. Continue efforts to stabilize and revegetate mouth of Denver Creek. At the Little Pittsburg Mine, surface structures are within the active channel of Denver Creek and one adit is flooded and filled with stream sediment. Hilarity mine needs revegetation and stream work and Denver Mine has open tunnels and collapsed stopes. All previous work needs to be evaluated in context of ROD and if warranted incorporate into remedial action program.</p>	<p>BLM, USEPA</p> <p>BLM, USEPA</p>	<p>BLM, USEPA</p> <p>BLM, USEPA</p>	<p>Construction Scheduled for Summer 2006</p> <p>Based on ROD schedule</p>	<p>N</p> <p>N</p>	<p>N</p> <p>N</p>

Table ES-9. Summary of Recommendations and Follow-Up Actions – Operable Unit 3 Removal Actions					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Douglas Mine and Mill Site: The mine discharge, old mill foundation area and rock dump areas will be evaluated in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program. Several homes have been constructed near floodplain containing tailings. This area needs to be evaluated for human exposure and exposure to grazing animals.	USEPA	BLM, USEPA	Based on ROD schedule	N	N
Highland Creek Floodplain: Ongoing revegetation and monitoring. Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	BLM	BLM, USEPA	Based on ROD schedule	N	N
Highland-Surprise (Includes Nevada Stewart Mine): High flows in Highland Creek have eroded the base of a Highland Surprise mine dump. Ongoing effort to revegetate the lower Highland Surprise rock dump. Mine adit discharge needs to be evaluated. Nevada Stewart rock dump needs further revegetation and site needs long term management of mine water discharge. Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	BLM	BLM, USEPA	Based on ROD schedule	N	N
Sidney (Red Cloud): Continue to monitor and operate the pilot water treatment unit. Evaluate waste rock pile and adit discharge in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	BLM	BLM, USEPA	Based on ROD schedule	N	N
Amy-Matchless Mill Site: Limited revegetation and stream stabilization at the Amy site. Matchless has waste rock dumps, collapsed tunnels, and discharges that need to be evaluated in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	BLM, USEPA	BLM, USEPA	Based on ROD schedule	N	N

Table ES-9. Summary of Recommendations and Follow-Up Actions – Operable Unit 3 Removal Actions					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Liberal King: Continue efforts to further revegetate and stabilize the stream reach with plantings of shrubs and trees. Evaluate mine opening, waste rock dump, and mill site foundation area in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	BLM	BLM, USEPA	Based on ROD schedule	N	N
Nabob: Tailings remain near the Nabob Mill that need to be addressed. The BLM is continuing the site investigation and is planning to install a cover over the tailings pile in the near future. Evaluate upper and mid rock dump, mine tunnel discharge and other actions taken in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	BLM, USEPA	BLM, USEPA	Based on ROD schedule	N	N
Moon Creek Silver Crescent and Charles Dickens: Ongoing monitoring.	USFS	IDEQ, USEPA, USFS	Based on ROD schedule	N	N
Elk Creek Pond at Mouth of Moon Creek: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	IDEQ, USEPA	IDEQ, USEPA	Based on ROD schedule	N	N
Upper South Fork Coeur d'Alene River Morning Mine No. 6: Routine monitoring	Hecla	IDEQ, USEPA	Annually	N	N
Osburn Flats: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	IDEQ, USEPA	IDEQ, USEPA	Based on ROD schedule	N	N
Grouse Creek We Like Mine and Star Rock Dump: Continue to evaluate and monitor the pilot bioreactor water treatment system. Rock dump needs stabilization and revegetation. Star Rock dump needs to be evaluated in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	BLM, USEPA	BLM, USEPA	Based on ROD schedule	N	N

Table ES-9. Summary of Recommendations and Follow-Up Actions – Operable Unit 3 Removal Actions					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
South Fork Coeur d'Alene River					
South Fork Floodplain Removals: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	IDEQ, USEPA	IDEQ, USEPA	Based on ROD schedule	N	N
Elizabeth Park Bank Stabilization: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	IDEQ,USEPA	IDEQ, USEPA	Based on ROD schedule	N	N
Lower Coeur d'Alene River					
Cataldo Mission: Post flood monitoring.	USEPA	Coeur d'Alene Tribe, USEPA	9/2010	N	N
Cataldo Boat Ramp: Incorporate into remedial action program and ongoing monitoring.	USEPA	USEPA	NA	N	Y
Black Rock Slough Trailhead/Highway 3 Crossing: Remedy is functioning as intended; continue to monitor streambank.	USEPA	USEPA	Ongoing	N	Y
Dudley Bank Stabilization: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	IDEQ,USEPA	IDEQ, USEPA	Based on ROD schedule	N	N
Medimont Bank Stabilization: Evaluate removal action in context of the 2002 OU3 ROD and if warranted incorporate into remedial action program.	Coeur d'Alene Tribe	Coeur d'Alene Tribe, USEPA	Based on ROD schedule	N	N
Medimont Boat Launch: Recommend that USFS consider paving existing boat launch area and establish paved picnic site near restrooms on north side of site. Continue day use only limitation. Address bank stabilization issues. Consider establishment of overnight RV parking area.	USFS	USFS	TBD Pending Funding	N	Y

Table ES-9. Summary of Recommendations and Follow-Up Actions – Operable Unit 3 Removal Actions					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 year)	Future (>1 year)
Rainy Hill Boat Launch: due to gradual recontamination from flooding and high spring flows, USFS plans to cap with asphalt.	USFS	USFS	TBD Pending Funding	N	Y
Anderson Lake Boat Launch: The USEPA will continue to stay abreast of plans for Hwy 97 bridge replacement to the extent that this activity may influence the Superfund actions at the Idaho Department of Fish & Game's (IDFG's) Anderson Lake Facility. Pending completion of designs for the Highway 97 bridge replacement, the USEPA, the IDFG, and the Recreational Area Project Focus Team (PFT) will evaluate the potential need for additional cleanup work at this site.	USEPA	USEPA	Ongoing	N	N
Trail of the Coeur d'Alenes					
Harrison Beach Sand: Continue to monitor performance.	UPRR	Coeur d'Alene Tribe, State of Idaho	9/2010	N	Y
Unauthorized Use Patterns: Continue monitoring.	UPRR	Coeur d'Alene Tribe, State of Idaho	9/2010	N	Y
TLOP: Finalize TLOP and begin implementation.	Coeur d'Alene Tribe, State of Idaho	EPA	5/2006	N	Y
Management Agreement: Finalize and Implement State-Tribe Management Agreement.	Coeur d'Alene Tribe, State of Idaho	EPA	5/2006	N	Y

Table ES-10. Summary Activities and Remedial Actions – Operable Unit 3			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Institutional Controls Program (ICP)	PHD, IDEQ, USEPA	Yet to be established	The OU3 ICP has not yet been established, however, the PHD has met with local officials to begin discussions of program requirements, using the OU1 and OU2 ICP as a model. The OU3 ICP is expected to include several program components such as permitting, inspections, and the development of local construction regulations to be coordinated with local governments and other entities.
Health and Safety During Remediations	IDEQ, USEPA	Ongoing	Ensure that remedial actions are implemented safely and in accordance with applicable regulations and guidance.
Residential and Community Soil Remediations	IDEQ, USEPA	2003-Present	Remediating lead- and arsenic-contaminated soil in residential yards, street rights-of-way, and commercial properties in Upper and Lower Basin communities. High-risk properties are prioritized for cleanup throughout OU3, and target area cleanup has been initiated in the communities of Mullan and Osburn. Also have provided alternate drinking water supplies for residences on contaminated private wells.
Coeur d'Alene Lake Fish Investigation	USEPA	2002-2003	Collaborative study to address data gap in human health risk assessment. Resulted in IDHW and Coeur d'Alene Tribe joint issuance of fish consumption advisory in June 2003.
Lower Basin Recreational Areas:			
East of Rose Lake Boat Launch	USEPA	2003-2004	Created clean recreational area - capped contaminated soil in existing parking lot, re-built boat launch, stabilized bank to reduce erosion and human exposure to contaminated river bank.
Highway 3/Trail of the Coeur d'Alenes Crossing	USEPA	2003-2004	Created clean recreational area - built upon previous removal action conducted in 2000, capped contaminated soil with combination of pavement, topsoil/fabric/grass cap.
Informational Signage	USEPA	1991; 1999; 2004	Information signage was installed at nine recreational sites where implementation of effective, low maintenance remedial action would be difficult. Signs were initially installed in 1991 and updated in 1999 as part of Basin time critical removal actions.
Evaluation of sites	USEPA, USFWS	Ongoing	Continue to evaluate and identify additional Lower Basin recreational areas that may require cleanup.
Migratory Songbird Study	USEPA, USFWS	Ongoing	Conducting study provide site-specific data for incorporation into a risk analysis to determine if songbirds are at risk of lead exposure and to determine the lead concentrations in soil associated with potential adverse effects.

Table ES-10. Summary Activities and Remedial Actions – Operable Unit 3			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Canyon Creek Water Treatment Pilot Study	USEPA	2004-Present	Testing for Phase I of the treatability study was completed in December 2004. Phase II is underway and consists of pilot-scale testing of selected active technologies and both bench- and pilot-scale testing of “passive” technologies that could address partial surface or groundwater treatment.
Agricultural to Wetland Conversions	USEPA	Ongoing	Identify potentially interested landowners.
Soil Amendment Study	IDEQ, USEPA, USFWS	2001-2004	Two-pronged collaborative study using both lab and field studies to evaluate effectiveness of phosphate-based soil amendments to reduce bioavailability and leachability of heavy metals.
Silver Dollar Growth Media Pilot	IDEQ	2002-Present	Continue to Evaluate Growth Media Pilot Project (See text in Section 5.5).
Spokane River, Washington Recreational Areas	USEPA	2002-Present	Design at Starr Road complete in 2005, and remedial actions will be implemented in 2006. Design for Island Complex will be completed in 2006, and the remedial action initiated in 2006.
Sisters Site	IDEQ, USEPA	2004-2005	In 2004, the USEPA initiated the remedial design for this site for implementation by the State of Idaho during the summer of 2005. Completed remediation in 2005.
Rex Mine and Mill	BLM, USEPA	2002-2004	Stabilization of waste rock dump and stream by-pass around tailings by BLM. In 2004 USEPA initiated the remedial design for this site which included collection of pre-design data. The remedial design is expected to be complete by the spring of 2006 with construction scheduled to start in the summer of 2006. Construction is scheduled to be completed by 2007.
Constitution Site	USEPA, BLM	2004-2005	In 2004 USEPA and BLM initiated the remedial design for this site for implementation of the remedial action in 2005. Construction of the remedy is scheduled to start in the fall of 2005 and be completed by 2006.
Golconda Site	IDEQ, USEPA	2004-2005	In 2004 USEPA initiated the remedial design for this site for implementation of an interim action by the State of Idaho during the summer of 2005. The overall site remedy construction is scheduled to begin in the summer of 2006.
Coeur d’Alene Mine and Mill	Coeur Silver Valley	2001-	Prior to demolition, all salvageable metal materials were removed, decontaminated and taken offsite. The mill building was pulled apart using an excavator. A few large timbers were decontaminated and saved. The remainder of the demolition materials, primarily wood, was fed into a chipper which reduced volume by 90 percent. Once mill building was removed, the foundation and ore bins were cleaned. Fencing at the site was repaired and improved. Large boulders were placed at selected potential access points. Signs were placed at appropriate locations.

Table ES-10. Summary Activities and Remedial Actions – Operable Unit 3			
Activity or Remedial Action	Responsible Entity	Dates	Description of Activity or Remedial Action
Silver Summit Mill	Sunshine Mining Company	2001	Labeled and removed all containers of solvents, lubricants, processing chemicals, paint and trash. A PCB investigation was conducted for all transformers and oil switches located throughout the site and none was found. Access controls were established.
Big Creek Repository	IDEQ, USEPA	2002-Present	Established repository on former Sunshine Mining Co. tailings pond for contaminated soil and other materials removed during implementation of the remedial actions.
OU3 Basin Environmental Monitoring Plan (BEMP)	USEPA	2004-Present	OU3-wide environmental monitoring plan designed to monitor and evaluate progress of remedy in terms of improving environmental conditions. Results available on www.storet.org .
Coeur d'Alene Lake	Coeur d'Alene Tribe, IDEQ	2002-Present	Fish consumption study, preparation of Lake Management Plan (LMP) implementation of Lake Environmental Monitoring Plan (LEMP).

Table ES-11. Summary of Issues - Operable Unit 3 Remedial Actions		
Issues	Affects Protectiveness (Y/N)	
	Current (now to 1 year)	Future (>1 year)
Institutional Controls Program (ICP): An OU3 ICP has not yet been established and remedial actions are being implemented.	Y	Y
Residential and Common Use Remediation: Lead Health Intervention Program (LHIP): Funding for this program has been discontinued by ATSDR. The IDEQ funded LHIP activities in 2004. Annual blood lead screening participation rates have declined in the last three years. Infrastructure: Infrastructure upgrades and maintenance are critical to long-term remedy success. Resources to repair and install infrastructure that will help prevent recontamination of protective barriers need to be identified. State and federal governments will need to assist with the identification of resources.	N Y	Y Y
Migratory Songbird Study Data Gaps: Did not assess areas with soil concentrations less than 1,100 mg/kg (dw) and so potential adverse effects on songbirds is not known when the songbirds are inhabiting areas with soil lead less than 1,100 mg/kg (dw). Sub-lethal Effects: Impact of sub-lethal effects on songbirds is unclear. Population-level Impacts: Did not assess potential population-level impacts, particularly at areas where might expect clinical effects on individual songbirds (e.g., Cataldo, Strobl based on liver lead concentrations in song sparrows).	N N N	N N N
Canyon Creek Water Treatment Pilot Study Treatment Technologies: Need to identify treatment technologies that will meet the goals of the 2002 OU3 ROD at the lowest possible long-term operation and maintenance (O&M) cost.	Y	Y
Agriculture to Wetlands Identify Landowners: Need to identify landowners interested in agricultural to wetland conversion.	N	Y

Table ES-11. Summary of Issues - Operable Unit 3 Remedial Actions		
Issues	Affects Protectiveness (Y/N)	
	Current (now to 1 year)	Future (>1 year)
Soil Amendment Study Further Study: Further study is needed to resolve questions concerning optimal application rates, long-term stability, ecological impacts, and potential seasonal effects.	N	N
Repository New Sites: Need for additional repository space.	N	Y
Coeur d'Alene Lake Lake Eutrophication: Control of lake eutrophication and potential release of metals from contaminated sediments.	Y	Y

Table ES-12. Summary of Recommendations and Follow-up Actions – Operable Unit 3 Remedial Actions					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 yr)	Future (> 1 year)
Secure Funding for Full Implementation of Interim OU3 Remedy EPA Region 10 has received funding for implementation of the OU3 human health remedy. The Region will continue to work with EPA Headquarters and other parties to secure funding for full implementation of the 2002 OU3 ROD.	USEPA	USEPA	Ongoing	Y	Y
Institutional Controls Program (ICP) Establish an OU3 ICP as soon as possible to protect barriers from disturbance and minimize recontamination.	IDEQ, PHD, USEPA	USEPA	12/2006	Y	Y
Health and Safety During Remediations Continue successful implementation of safety programs as evidenced by no lost time or injuries reported.	IDEQ, USEPA	USEPA	Ongoing	Y	Y
Residential and Community Area Remediation Human Health Exposure Profile: Complete an updated exposure profile for OU3. Implement Actions: Continue to implement remedial actions. Lead Health Intervention Program (LHIP): Identify additional funding sources for the LHIP. Continue to evaluate options for increasing participation in annual blood lead screening program. Infrastructure: Work with Basin communities and state and federal agencies on an infrastructure plan to ensure remedy success.	IDEQ, USEPA IDEQ IDEQ, PHD, USEPA IDEQ	USEPA USEPA USEPA PHD, USEPA	12/2006 12/2009 12/2005 12/2008	N Y N Y	Y Y Y Y
Coeur d'Alene Lake Fish Investigation Future Sampling: Evaluate the need for additional fish tissue sampling and testing in Coeur d'Alene Lake to assess the applicability of the current fish consumption advisory.	Coeur d'Alene Tribe and State of Idaho	Coeur d'Alene Tribe and State of Idaho	9/2010	N	Y

Table ES-12. Summary of Recommendations and Follow-up Actions – Operable Unit 3 Remedial Actions					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 yr)	Future (> 1 year)
Lower Basin Recreational Areas					
Remedial Action Effectiveness Monitoring: Implement remedial action effectiveness monitoring programs at the East of Rose Lake Boat Launch and the Highway 3/Trail of the Coeur d'Alenes crossing sites.	USEPA	USEPA	Ongoing	N	N
East of Rose Lake Boat Launch: Continue remedial action effectiveness monitoring.	USEPA	USEPA	9/2010	N	Y
Highway 3/Trail of the Coeur d'Alenes Crossing: Continue remedial action effectiveness monitoring.	USEPA	USEPA	9/2010	N	Y
Informational Signage: Replace damaged signs as needed.	USEPA	USEPA	Ongoing	N	N
Additional Areas: Identify and evaluate additional Lower Basin recreational areas that may require cleanup.	USEPA	USEPA	Ongoing	N	N
Migratory Songbird Study					
Risk Analysis: Conduct a risk analysis with data generated from the migratory songbird study, and assess any data gaps identified.	USEPA	USEPA	9/2010	N	Y
Survey and MAPS: Continue the Breeding Bird Survey and MAPS route through the Lower Coeur d'Alene River Basin to determine bird diversity. Assist managers in riparian habitat remedial decisions.	USEPA	USEPA	Ongoing	N	Y
Canyon Creek Water Treatment Pilot Study					
Treatment Technologies: Complete pilot studies to evaluate active and passive technologies to achieve the goals of the 2002 OU3 ROD.	USEPA	USEPA	Ongoing	Y	Y
Agricultural to Wetland Conversions					
Identify Landowners: Identify landowners interested in agricultural to wetland conversion.	USEPA	USEPA	Ongoing	N	Y

Table ES-12. Summary of Recommendations and Follow-up Actions – Operable Unit 3 Remedial Actions					
Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current (now to 1 yr)	Future (> 1 year)
Soil Amendment Study Further Studies: Evaluate findings of follow-up study and, as appropriate, conduct further evaluations of technical feasibility of soil amendments.	IDEQ, USEPA	USEPA	9/2010	N	N
Silver Dollar Growth Media Pilot Further Monitoring: Continue annual monitoring and use results to help develop vegetative covers for future remedial actions.	IDEQ	IDEQ	Ongoing	N	N
Upper Basin Mine and Mill Sites Complete remedial designs (RDs) at Rex and Golconda sites. Initiate construction of the remedy at Constitution, Rex, and the Golconda. Identify additional Mine and Mill sites to begin RD.	BLM, IDEQ, USEPA	BLM, USEPA, IDEQ	RD completion at 2 sites 9/2005. RA start at 2 sites 10/2005	N	Y
Repositories Big Creek: Continue to implement remedial actions at Big Creek Repository. New Sites: Continue search and evaluation of potential repository sites.	IDEQ, USEPA IDEQ, USEPA	IDEQ, USEPA IDEQ, USEPA	9/2010 9/2007	N N	Y Y
OU3 Basin Environmental Monitoring Plan (BEMP) Continue to implement the BEMP.	USEPA	USEPA	Ongoing	N	Y
Remedial Action Effectiveness Monitoring Continue implementation of remedial action effectiveness monitoring at recreational areas and include RA effectiveness monitoring in the designs and implementation plans for ecological-related remedial actions.	USEPA and/or implementing entity	USEPA	Ongoing	N	N
Coeur d'Alene Lake Lake Eutrophication: Complete Lake model.	Coeur d'Alene Tribe, USGS	USEPA	12/2006	Y	Y
Lake Management Plan: Complete and initiate Lake Management Plan.	Coeur d'Alene Tribe, IDEQ	USEPA	4/2006	N	Y

[This page intentionally left blank.]

Five-Year Review Summary Form

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Bunker Hill Mining and Metallurgical Complex		
USEPA ID (from WasteLAN): IDD048340921		
Region: 10	States: Idaho & Washington:	Counties: Shoshone, Kootenai, Benewah Counties in Idaho, and Spokane County in Washington
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input checked="" type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs?* <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: ____/____/____	
Has site been put into reuse? <input type="checkbox"/> YES <input type="checkbox"/> NO + Portions of the site have been put into reuse.		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> USEPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: USEPA Region 10		
Author title:	Author affiliation:	
Review period:** 08/01/2004 to 04/30/2005		
Date(s) of site inspection: 10/19/2004		
Type of review: <div> <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion </div>		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <div> <input type="checkbox"/> Actual RA Onsite Construction at OU #____ <input type="checkbox"/> Actual RA Start at OU# ____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify) </div>		
Triggering action date (from WasteLAN): 09/27/2000		
Due date (five years after triggering action date): 09/27/2005 (Due to a request by the Idaho Congressional delegation, the public comment period was extended for an additional 30 days, which caused the completion of this report to be one month late).		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form

Issues:

See Executive Summary Tables ES-2, ES-5, ES-8, and ES-9.

Recommendations and Follow-up Actions:

See Executive Summary Tables ES-3, ES-6, ES-9, and ES-12.

Protectiveness Statements:

Operable Unit 1 (OU1). The remedy being implemented in OU1 is expected to be protective of human health and the environment upon completion, provided that follow-up actions identified in the final report are implemented.

Although the remedy has not been fully implemented, environmental data (except right-of-way [ROW] data) indicate that the remedy is functioning as intended by the Record of Decision (ROD). As remediation nears completion, soil and house dust lead concentrations are declining, lead intake rates have been substantially reduced, and blood lead levels have achieved their remedial action objectives (RAOs). House dust lead levels are declining but some individual homes continue to exceed lead concentrations of 1,000 milligrams per kilogram (mg/kg). For ROWs, data indicate that lead levels are stabilizing but are continuing to slowly increase over time.

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy; however, due to the history of flooding in the area, it is possible that future flood events may affect remedy protectiveness. In addition, the ability of the local communities to improve and maintain infrastructure to protect the remedy is a concern. Infrastructure improvements and ROW recontamination will be evaluated in the next five-year review, as well as determining whether all the RAOs have been met once the remedy is completed.

Operable Unit 2 (OU2). The remedy being implemented in OU2 is expected to be protective of human health and the environment upon completion, and in the interim, human health exposure pathways that could result in unacceptable risks are being controlled.

In 1995, with the bankruptcy of the Site's major Potentially Responsible Party (PRP), the USEPA and the State of Idaho defined a path forward for phased remedy implementation in OU2. Phase I of remedy implementation includes extensive source removal and stabilization efforts, all demolition activities, all community development initiatives, development and initiation of an Institutional Controls Program (ICP), future land use development support, and public health response actions. Also included in Phase I are additional investigations to provide the necessary information to resolve long-term water quality issues, including technology assessments and pilot studies, evaluation of the success of source control efforts, development of site-specific water quality and effluent-limiting performance standards, and development of a defined operation and maintenance (O&M) plan and implementation schedule. Interim control and treatment of contaminated water and acid mine drainage (AMD) is also included in Phase I of remedy implementation. Phase I remediation began in 1995, and source control and removal activities are near completion.

Since beginning the implementation of Phase I in 1995, a significant amount of remediation work has been conducted. As summarized in Table 4-1 of this report, over 3.3 million cubic yards of contaminated waste have been removed and consolidated onsite in engineered closure areas (the Smelter and Central Impoundment Area Closures). The use of geomembrane cover systems on these closure areas effectively removes these contaminated wastes from direct contact by humans and biological receptors. Consolidating these wastes in engineered closures also substantially reduces the exposure pathway to the surface water and groundwater environment in comparison to pre-remediation site conditions.

Also, as summarized in Table 4-1, over 800 acres of property within OU2 have been capped to eliminate direct contact with residual contamination that remains in place within some areas of OU2. In addition, the revegetation work conducted as part of the Phase I remedial actions has substantially controlled erosion and has significantly improved the visual aesthetics of OU2. The success of the Phase I revegetation efforts is providing improved habitat for wildlife that was largely absent for decades in many areas of the hillsides and Smelterville Flats.

All of these efforts have reduced or eliminated the potential for humans to have direct contact with soil/source contaminants, have reduced opportunities for transport of contaminants by surface water and air, and are expected to provide surface and groundwater quality improvements over time throughout the Site.

Phase II of the OU2 remedy will be implemented following completion of source control and removal activities and evaluation of the impacts of these activities on meeting water quality improvement objectives. Phase II will consider any shortcomings encountered in implementing Phase I and will specifically address long-term water quality and environmental management issues. In addition, the ICP and future development programs will be reevaluated as part of Phase II.

Five-Year Review Summary Form

The effectiveness evaluation of the Phase I source control and removal activities to meet the water quality improvement objectives of the 1992 OU2 ROD will be used to determine appropriate Phase II implementation strategies and actions. In addition, although the 1992 OU2 ROD goals did not include protection of ecological receptors, additional actions may be considered within the context of site-wide ecological cleanup goals. Both ROD and State Superfund Contract (SSC) amendments are required prior to implementation of Phase II remedial actions.

Per the motion passed by the Basin Environmental Improvement Project Commission (Basin Commission) in August 2005, the Basin Commission will participate in future Phase II activities in OU2 by providing technical input into the remedy alternative development and selection (including evaluation of technical reports, pilot studies, and feasibility study documents), providing input into the public processes associated with ROD modifications and educating the community and legislative bodies of the need for funding for this work.

In addition to evaluating Phase I actions and identifying possible Phase II actions, a SSC amendment that allows for the full implementation of the 2001 OU2 ROD Amendment needs to be negotiated and signed. Time-critical components of this ROD amendment were implemented to prevent catastrophic failure of the Central Treatment Plant (CTP) and discharges of AMD to Bunker Creek and the South Fork of the Coeur d'Alene River (SFCDR). Until a SSC amendment is signed, however, control and treatment of AMD and its impact on water quality will continue to be an issue. The USEPA and the State of Idaho continue to discuss the SSC amendment and the long-term obligations associated with the mine water remedy.

Operable Unit 3 (OU3). The OU3 ROD is a 30-year cleanup plan that was published by the USEPA in September 2002. Therefore, remedy implementation has been ongoing for approximately three years and a protectiveness determination of the OU3 remedy cannot be made until further information is obtained. This additional information will be collected during the implementation of the remedy and through the completion of studies that support the remedy. For the human health remedy being implemented in the OU3 residential and community areas, including identified recreational areas, the remedy is expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled. OU3 ecological remedial actions have not yet been implemented. Protectiveness of the OU3 remedy will be evaluated in the next five-year review.

[This page intentionally left blank.]